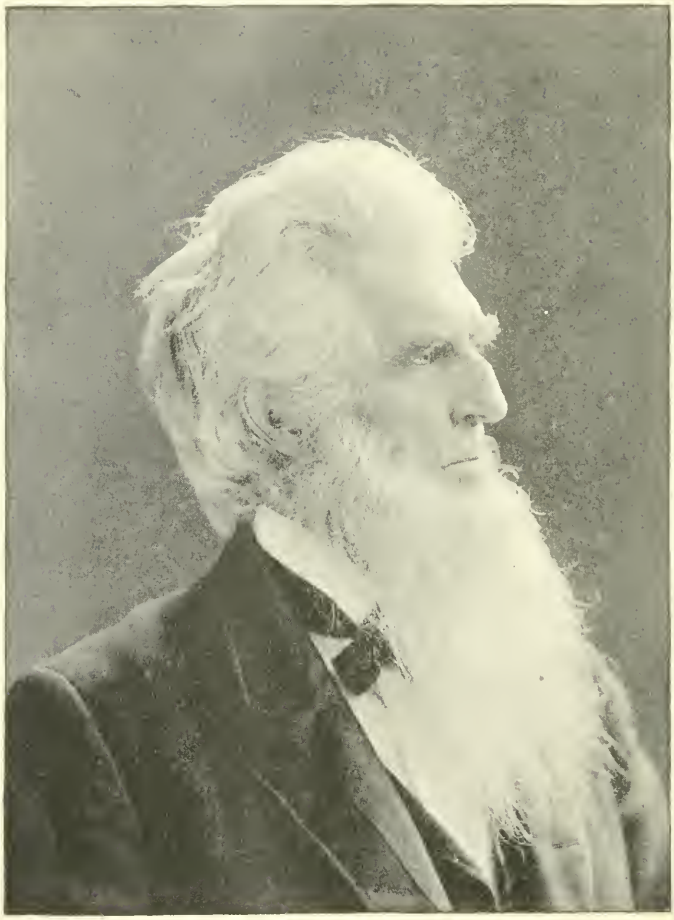
Wood Notes Wild

Simeon Pease Cheney

FOR THE PEOPLE
FOR EDVCATION
FOR SCIENCE

LIBRARY
OF
THE AMERICAN MUSEUM
OF
NATURAL HISTORY

J. A. Allen



WOOD NOTES WILD

NOTATIONS OF BIRD MUSIC

BY

SIMEON PEASE CHENEY

AUTHOR OF THE "AMERICAN SINGING-BOOK"

COLLECTED AND ARRANGED WITH APPENDIX, NOTES, BIBLIOGRAPHY, AND GENERAL INDEX

BY JOHN VANCE CHENEY

AUTHOR OF THE "GOLDEN GUESS" (ESSAYS ON POETRY), "THISTLE-DRIFT" (POEMS), "WOOD BLOOMS" (POEMS), ETC.

BOSTON

LEE AND SHEPARD PUBLISHERS

10 MILK ST. NEXT "THE OLD SOUTH MEETING HOUSE"

1892

Copyright, 1891,
By Lee and Shepard.

All rights reserved.

WOOD NOTES WILD.

University Press:
John Wilson and Son, Cambridge.

Now blessings on ye all, ye heroic race,
Who keep their primitive powers and rights so well,
Though men and angels fell.
Of all material lives the highest place
To you is justly given,
And ways and walks the nearest heaven.

COWLEY.

Whose household words are songs in many keys,
Sweeter than instrument of man e'er caught;
Whose habitations in the tree-tops even
Are half-way houses on the road to heaven.

LONGFELLOW.

I have often reflected with surprise on the diversity of the means for producing music with insects, and still more with birds. We thus get a high idea of the importance of song in the animal kingdom.

DARWIN.

Many kyndes of voyces are in the world, ande none off them without significacion. — Tyndall's trans. of 2 COR. xiv. 10.

EDITOR'S PREFACE.

THIS collection of New England bird-songs was begun when the author was in his sixty-seventh year, and left unfinished when, the tenth of May, 1890, he passed suddenly away, being two years beyond his threescore and ten. It is a record of the pastime of an old lover of the birds, of a musician who counted it among his chief joys that he had lived thirty summers in a bird-haunted grove, — of one to whom the voices of the wood and field were as familiar as those of his own family. The intention was to write a book for the young people of New England, many of whom he had taught the rudiments of vocal music. The volume was to be made up of bird-songs and observations on the domestic animals, with special reference to their several forms of utterance. Something was also to be said of the music of inanimate things. The thought came too late; and it remains for the present writer — not unacquainted with his father's work and wishes — to gather together such fragments as were to be found.

Brief, imperfect as the record is, it may yet have value if, written without apprenticeship in the endeavors of exact knowledge, it accord here and there with the conclusions

of science. Strange as it may seem in one that loved Nature so well, the author read but four authorities on the birds, — Audubon, Wilson, the first part of Stearns's "New England Bird Life," edited by Dr. Coues, and Minot's "Land and Game Birds of New England;" and none of these were taken up until more than half the work here presented was done. The position is individual, isolated; hence it has been thought advisable to prepare an appendix of expression from those more or wholly at home in the delightful field through which our author strolled, when the mood was on, innocently absorbed, oblivious to the brilliant company before him and on either side.

Pliny tells how, by mixing the blood of certain birds, a serpent was produced, which eaten of, enabled one to understand what the birds said; and it is possible that this old simple-hearted, rustic singing-master nibbled deeply enough into the inspiring serpent to interest not only the lover of natural things but those with whom it was not his lot to mingle, — his learned contemporaries. At any rate, he has spoken in his own native way, and his brief message may be audible, if for no other reason, because of the "over-faint quietness" both here and abroad. While wanting certain accessory qualifications for his pleasure-task, our author had this prime requisite, — music was as natural to him, had as much meaning for him, as words. Sound was as much to him as sight. It was his habit to name the pitch, and to dwell on the quality, of any sound he might hear from things animate or inanimate. His test of a poem was the

character of the tones it set ringing in his mind. Music was the standard. In addition to this, and hardly less important, his heart and brain were full of youth and enthusiasm; he stood to the last before both man and Nature, decided in his likes and dislikes, hearty in his love and hatred, eager and joyous — and wayward — as a boy. "My threescore and ten are numbered," he writes on his birthday, "but for the life of me I can't feel old, can't think old." Such, in a word, was the reporter of the "Wood Notes Wild;" and the only justification of his work that he cared to make was characteristically simple, — "A little bird told me so."

As before stated, it has been sought, by means of an appendix, to supplement the record of the birds the songs of which are presented, and to point to such information on the general subject of bird music as might prove accessible, — the matter being drawn from both scientific and popular sources. Few supplementary notations of bird songs appear, for the reason that they are not easy to find. Indeed, two hundred letters sent to ornithologists and librarians of this country and of Europe, in addition to no little personal research, indicate that there are not many such notations in existence. Dr. F. Granauer, of *K. K. Universitäts-Bibliothek*, Vienna, writes that none are to be found in that library either in books or periodicals; while Dr. Golz, of Berlin, writes: "What your Audubon, Wilson, and others say with reference to the bird-songs has not been excelled in Germany. What we have is in Brehm's 'Gefangene Vögel.'" Brehm's work contains no notations.

Librarian F. Thomae, University Library of Tübingen, writes that the only work on bird music known to him is Landois's "Thierstimmen." Dr. Russ, of Berlin, writes a little more encouragingly, saying that there are a few notations of bird-songs scattered through "Die gefiederte Welt," a periodical at present under his direction. After this report from music-loving, nature-loving, studious Germany, there is little hope of help elsewhere.

The editor, no more of an ornithologist and much less of a musician than the author, cannot hope that he has steered clear of error; he hopes only for the general judgment that the work were better done crudely than not at all. A most grateful acknowledgment is made to the many authors, editors, publishers, and proprietors whose names appear, in connection with their several contributions, in the index and in the list at the end of the volume.

JOHN VANCE CHENEY.

San Francisco,
December 29, 1891.

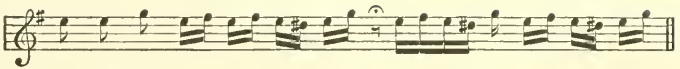
FACSIMILE AND TRANSCRIPT.

FROM A LETTER TO MISS JANET VANCE, WRITTEN IN 1888.

(*Transcript.*)

Beat that, anybody who can.

The yesterday's song from the unknown author was



I have become sure there is nothing so wonderful on earth as the birds and their music. Music here and music hereafter is my motto. Amen.

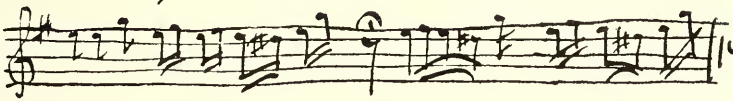
Remaining yours as ever,

SIM. PEASE CHENEY.

(*See* facsimile opposite.)

Breaththeft, any body who can

The yesterday's song from the unknown author was



I hope because sure there is nothing so wonderful on earth as the birds & their music - Music here & music hereafter is my motto - Amen -

Remaining yours as ever Sir Roger Cherry

CONTENTS.

	PAGE
Introduction	1
Bluebird (*Sialia sialis*)	11
Robin (*Turdus migratorius*)	14
Song-sparrow (*Melospiza melodia*)	23
Chickadee (*Parus atricapillus*)	27
White-bellied Nuthatch (*Sitta Carolinensis*)	29
Golden-winged Woodpecker; Flicker (*Colaptes auratus*)	30
Meadow Lark (*Sturnella magna*)	33
Field Sparrow (*Spizella pusilla*)	35
Linnet; Purple Finch; Purple Grosbeak (*Carpodacus purpureus*)	37
Yellow-bird; American Goldfinch (*Chrysomitris tristis*)	39
Chipping Sparrow (*Spizella socialis*)	40
White-throated Sparrow (*Zonotrichia albicollis*)	42
Fox-colored Sparrow (*Passerella iliaca*)	44
Chewink; Towhee Bunting; Ground Robin (*Pipilo erythrophthalmus*)	45
Yellow Warbler (*Dendroica æstiva*)	47
Black-throated Green Warbler (*Dendroica virens*)	48
American Warblers (*Sylvicolidæ*)	49
Redstart (*Setophaga ruticilla*)	51
Cat-bird (*Mimus Carolinensis*)	52
Brown Thrush; Brown Thrasher (*Harporhynchus rufus*)	54
Wood Thrush; Song Thrush (*Turdus mustelinus*)	56

PAGE

Tawny Thrush; Wilson's Thrush; Veery (*Turdus fuscescens*) 58
Hermit Thrush (*Turdus pallasi*) 59
Oven-bird; Golden-crowned Accentor (*Seiurus aurocapillus*) 62
Wood-pewee (*Contopus virens*) 64
The Night-hawk (*Chordeiles Virginianus*) 66
Whippoorwill (*Antrostomus vociferus*) 68
Baltimore Oriole (*Icterus Baltimore*) 71
Scarlet Tanager (*Pyranga rubra*) 74
Rose-breasted Grosbeak (*Goniaphea Ludoviciana*) . . . 76
Red-eyed Vireo (*Vireo olivaceus*) 78
Yellow-breasted Chat (*Icteria viridis*) 79
Bobolink (*Dolichonyx oryzivorus*) 82
Indigo-bird (*Cyanospiza cyanea*) 85
Black-billed Cuckoo (*Coccygus erythrophthalmus*) . . . 87
Yellow-billed Cuckoo (*Coccygus Americanus*) 89
Quail; Bob White (*Ortyx Virginianus*) 90
Ruffed Grouse; Partridge; Pheasant (*Bonasa umbellus*) 92
Great Northern Diver; Loon (*Colymbus torquatus*) . . 95
Great Horned Owl (*Bubo Virginianus*) 98
Mottled Owl; Screech-owl (*Scops asio*) 100
Hen Music 104

APPENDIX 113
Various Notations of the Music of Nature . . 205
Bibliography 229
Acknowledgments 241

INDEX 245

INTRODUCTION.

SOME six years ago, when I began to prepare this little collection of the songs of the more common birds of New England, I anticipated many difficulties; and they have been realized. The singing season is brief, and no one locality will suffice. Again, when one is so fortunate as to find a bird long sought, he may not sing; and if he does, the next moment he may fly beyond hearing or finding. Besides, it requires several repetitions of a song to insure accuracy in the copy; and the song of to-day may be so varied to-morrow as to be hardly recognizable. Another difficulty, well worthy of mention, is the newness of the field. At the time I took down my first song I had no knowledge of any person in America who had made the attempt; and thus far I have found no hint that has been of service to me.

Fifty years' experience as a singing-master has taught me that there is nothing people think so much of, pay so much money for, and still know so little about, as music. Most emphatically may this, save the money clause, be affirmed of the music of Nature. However thoroughly

the birds are considered in every other point, when we come to their music, — that is, to the very life, the spirit, — we must take our choice between silence and error. A modern English writer says, for example, "There is no music in Nature, neither melody nor harmony." What is melody but a succession of simple sounds differing in length and pitch? How then can it be said that bird-songs are not melodies? And if melodies, that they are not music? A melody may be of greater or less length. I think we shall find that the little bird-songs are melodies, containing something of all we know of melody, and more too; and this in most exquisite forms.

. . . . . .

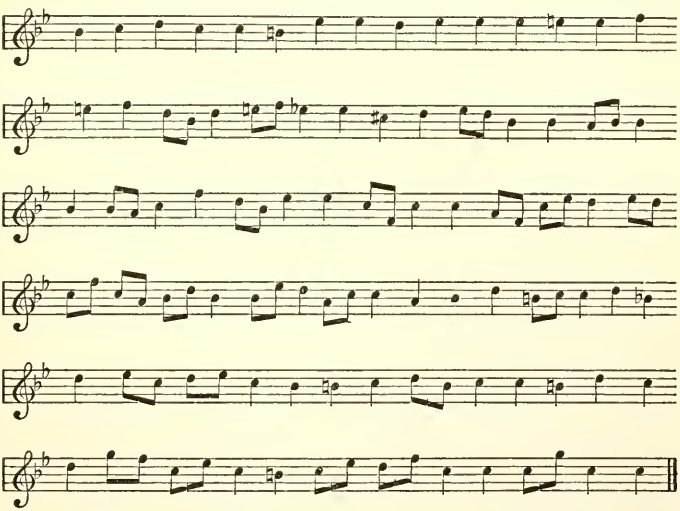
The writer just quoted observes further that "the cuckoo, who often sings a true third and sometimes a sharp third or even a fourth, is the nearest approach to music in Nature." I am not sure how it is in England, but with us the cuckoo's skill is slight for so wide a reputation. Of all the songs of our birds, his song has perhaps the least melody. It is as monotonous as it is protracted, hugging the tonic all the way, save an occasional drop of a minor second, the smallest interval in our scale. The cuckoo of New England never sings a third of any kind.

. . . . . .

"No music in Nature"! The very mice sing; the toads, too; and the frogs make "music on the waters." The summer grass about our feet is alive with little musicians.

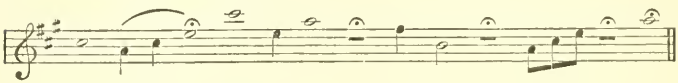
"The songs of Nature never cease,
Her players sue not for release.
In nearer fields, on hills afar,
Attendant her musicians are:
From water brook or forest tree,
For aye comes gentle melody,
The very air is music blent —
An universal instrument."

Even inanimate things have their music. Listen to the water dropping from a faucet into a bucket partially filled: —



I have been delighted with the music of a door as it swung lazily on its hinges, giving out charming tones resembling those of a bugle in the distance, forming pleasing melodic strains, interwoven with graceful slides

and artistic touches worthy of study and imitation. Awakened by the fierce wind of a winter night, I have heard a common clothes-rack whirl out a wild melody in the purest intervals: —



"No music in Nature"! Surely the elements have never kept silence since this ball was set swinging through infinite space in tune with the music of the spheres. Their voices were ever sounding in combative strains, through fire and flood, from the equator to the poles, innumerable ages before the monsters of sea and earth added their bellowings to the chorus of the universe. From the hugest beast down to the smallest insect, each creature with its own peculiar power of sound, we come, in their proper place, upon the birds, not in their present dress of dazzling beauty, and singing their matchless songs, but with immense and uncouth bodies perched on two long, striding legs, with voices to match those of many waters and the roar of the tempest. We know that in those monstrous forms were hidden the springs of sweet song and the germs of beautiful plumage; but who can form any idea of the slow processes, — of the long, long periods of time that Nature has taken in her progressive work from the first rude effort up to the present perfection? So far as the song is concerned, the hoarse thunderings of the elements, the bellowings of the monsters of both land and water, the voices of things animate and inanimate, — all must be forced, age on to

age, through her grand music crucible, and the precious essence given to the birds.

. . . . . .

Though the birds expressed themselves vocally ages before there were human ears to hear them, it is hardly to be supposed that their early singing bore much resemblance to the bird music of to-day. It is not at all likely that on some fine morning, too far back for reckoning, the world was suddenly and for the first time flooded with innumerable bird songs, and that ever since birds have sung as they then sang and as they sing now. There were no reporters to tell us when the birds began to sing, but the general history of human events chronicles the interest with which birds and bird-singing have been regarded by the nations of the past, leaving us to infer that when men and birds became acquainted, the birds were already singing.

. . . . . .

It would seem, then, that our bird music is a thing of growth, and of very slow growth. The tall walkers and squawkers having gradually acquired the material machinery for song, and the spirit of song being pent up within them, they were ultimately compelled to make music, to sing.

Dare we hazard a few crude conjectures as to the details of this growth? Every musical student is aware that there are certain tones which, if produced at the same moment, harmonize, merge one into another, with most pleasing effect. Our scale of eight tones represents the order of intervals throughout the whole realm of

sound; and the most natural combination of tones in it is the common chord, consisting of three tones, one, three, and five, forming two intervals, a major third and a minor third, which together make a fifth. These three tones are more readily appreciated by the uneducated ear than the regular order of tones in the scale. Players on the old-fashioned keyless bugles could play them, with their octaves perhaps, and nothing else; and boys can play them on long dry milk-weed stalks. I have been surprised at the readiness with which dull-eared boys learn to tune the strings of a violin, which are the interval of a fifth apart, while they are slow to determine the intervening tones. One and five of the scale, then, have the strongest affinity, the one for the other, of any two tones in it.

Now, after the "flight of ages," when the birds had emerged from the state of monstrosity, each raw singer having chanted continuously his individual tonic, there came a time when they must take a long step forward and enter the world of song. In the vast multitude of feathered creatures there must have been an endless variety of forms and sizes, and a proportionate variety in the pitch and quality of their voices. Day to day, year to year, each bird had heard his fellows squall, squawk, screech, or scream their individual tones, till in due time he detected here and there in the tremendous chorus certain tones that had a special affinity for his own. This affinity, strengthened by endless repetitions, at last made an exchange of tones natural and easy. Suppose there were two leading performers, the key of

one being G, and the key of the other being D, a fifth above G, what could have been more natural than for these two voices to unite, either on D or G, or both, and to vibrate into one? This accomplished, the bondage of monotony and chaos was broken forever, and progress assured; the first strain of the marvellous harmony of the future was sounded, the song of the birds was begun. One can almost hear those rude, rising geniuses exercising their voices with increased fervor, vibrating from one to five and five to one of the scale,—pushing on up the glad way of liberty and melody. With each vibration from one to five and from five to one, the leading tone of the scale, the other member of the common chord, which so affinitizes with one and five, was passed over. The next step was to insert this tone, which being done, the employment of the remaining tones was simply a matter of time. So it was, to my notion, that the birds learned to sing.

To say that the music of the birds is similar in structure to our own, is not to say that they use no intervals less than our least. They do this, and I am well aware that not all of their music can be written. Many of their rhythmical and melodic performances are difficult of comprehension, to say nothing of committing them to paper. The song of the bobolink is an instance in point. Indeed, one cannot listen to any singing-bird without hearing something inimitable and indescribable. Who shall attempt a description of the *tremolo* in the song of the meadow lark, the graceful shading and sliding of the tones of the thrushes? But these ornaments, be

they never so profuse, are not the sum and substance of bird-songs; and it is in the solid body of the song that we find the relationship to our own music. The songs of many of the birds may be detected as readily as the melodies of "Ortonville" and "Rock of Ages." In passing, one morning last summer, I heard a chewink sing the first strain of the beautiful old conference-meeting tune last named. Though I have never heard any other chewink sing that strain, it was a chewink that sang then, affording startling proof of the variation in the singing of the same birds. The chickadees sing a few long tones in the most deliberate manner; and nothing this side of heaven is purer. I do not refer to their *chick-a-dee-dee-dee* chat, though they sometimes connect that with their singing. The chickadee and the wood-pewee have the most devout of all the bird-songs I have heard.

. . . . . .

We all know how moderately and distinctly the little whistling, white-throated sparrow sings his song, and how the tiny black-throated green warbler sends out his few white notes of cheer from among the dark pines.

. . . . . .

Conjecture as we may concerning the growth and development of birds and bird-songs, we *know* that the birds now sing in a wonderful manner, using all the intervals of the major and minor scales in perfection of intonation, with a purity of voice and finish of execution, with an exquisiteness of melody, a magnetic and spiritual charm appurtenant to no other music on earth. The horse neighs, the bull bellows, the lion roars, the tiger

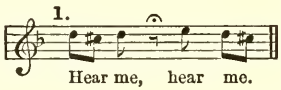
growls,— the world is full of vocal sounds; only the birds sing. They are Nature's finest artists, whose lives and works are above the earth. They have not learned of us; it is our delight to learn of them. To no other living things are man's mind and heart so greatly indebted. Myriads of these beautiful creatures, journeying thousands of miles over oceans and continents, much of the way by night — to avoid murderers! — return, unfailing as the spring, prompt even to the day and hour, to build their cunning nests and rear their young in our orchards and door-yards, to delight us with their beauty and grace of movement, and above, far above, all, to pour over the world the glory of their song. *He that hath ears to hear, let him hear.*

BLUEBIRD.

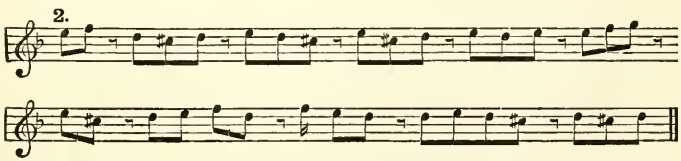
SIALIA SIALIS.

OUR first two spring visitors are the bluebird and the robin, the bluebird invariably coming first. The following are the principal features of the bluebird's songs as I took them, from time to time, last season.

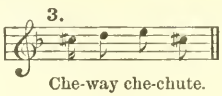
Early on the morning of the 17th of March my ear caught his first far, faint, but sweet notes.



The weather was cold, and I heard no more for several days; but on the morning of the 25th one made bold to come into the orchard, where he appeared to feel quite at home. Though it was still cold, his pure, soft notes held me within hearing for half an hour, during which time some of his morning talk (the music of a bluebird is often quite as much like talking as like singing) was secured.

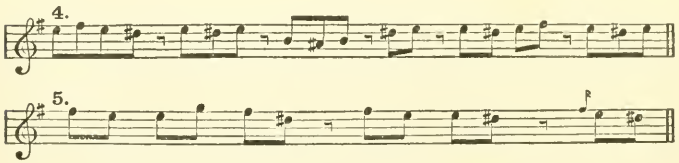


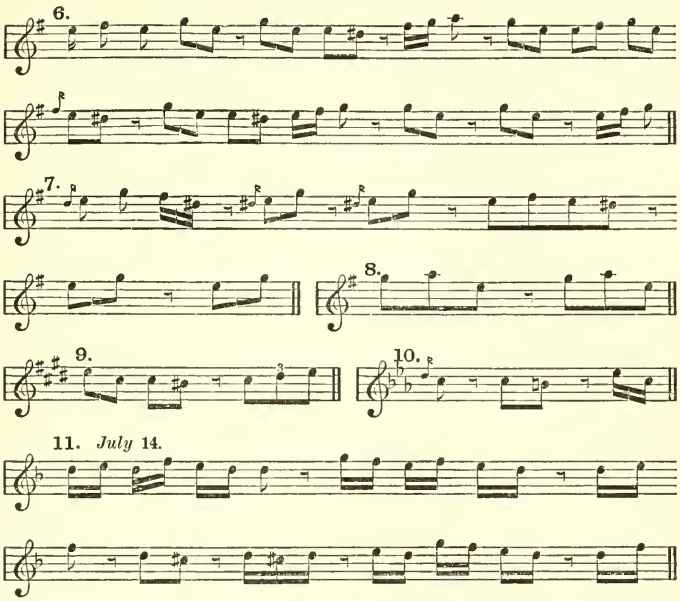
The next morning I heard him sing simply, —



The morning of the 28th being rainy, I feared I should see no birds, but by 9 o'clock the clouds began to vanish, and suddenly there were three species within four rods of my window,— a flock of snow-birds, a white-breasted nut-hatch, and the bluebird. The latter lit upon the stump of a small plum-tree, when white-breast lit upon the side of the stump and began to dart up and down and around, below him. The bluebird was evidently puzzled at his friend's eccentric movements. Shifting quickly from point to point, he would peer over in a very quizzical and comical manner, as much as to say, "How do you do that?" It was a pretty pantomime; and though no music was added to my notes, I was grateful for the call. When the silent birds took to the air and left me alone again, I could not but exclaim, "How beautiful are birds, and where is the match for the blue of the bluebird!"

Thus far the bluebird sang in the key of D minor. I afterward heard him sing in several keys, as here represented: —





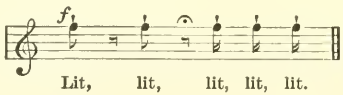
In these examples, the bluebird uses the minor key altogether: we have him in four positions of it. The fact that he sings in the minor key may partly explain the tenderness characterizing his song; but undoubtedly the plaintive quality of his tone is the more important factor. The written songs of the bluebird and the robin might lead one to conclude that their performance would produce much the same effect, but on hearing them the contrast is striking.

ROBIN.

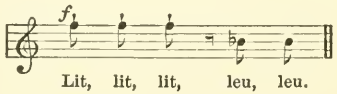
TURDUS MIGRATORIUS.

LAST season the robin was five days behind the bluebird. The first note I heard from him proved him a magician; the sound of his voice, filling the air with joy, spread a glow of instantaneous happiness over the morning landscape. Perched on the topmost twig of a tall maple, I had only time to lift my hat when he saluted me with,

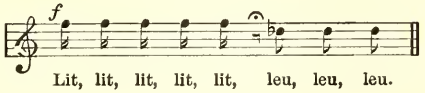
This he repeated two or three times with martial ardor and precision; then with his parting



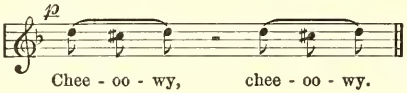
and with a flirt of his tail at each note, he left the grove. He flew high, scorning the earth, and did not return till evening. Then he did not sing; it was only,



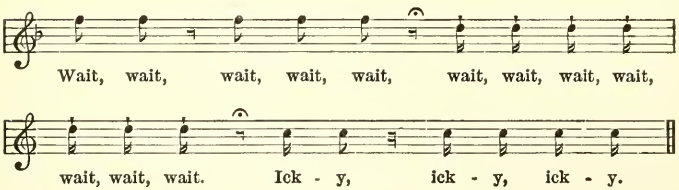
The effect was that of a call, but there was no answer. Soon he called again louder, with more rapid notes, giving another interval: —



The next morning he again appeared on the same twig, and called, "Lit, lit, lit," to which a bluebird promptly responded, —



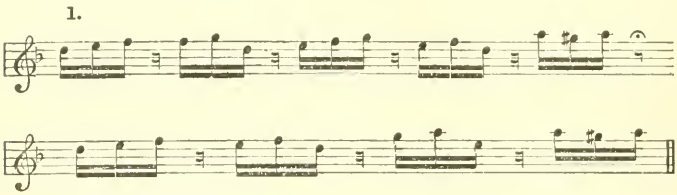
and a nuthatch rattled away merrily at them both, —



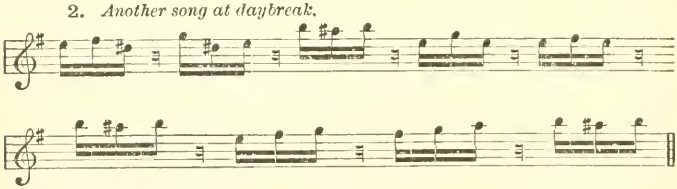
Some two weeks passed before the morning songs proper began, my first record being made May 5. On that morning before light, I was out, and within a few feet of a robin that struck up his song in a small pear-tree, not more than ten feet from the ground. On this occasion I settled one point; namely, that the robin frequently sings other notes than those heard. He has a habit of, as it were, closing his mouth between strains, and making muffled, indistinct tones — an imperfect echo, or better,

a burlesque repetition. The effect is humorous; for he seems to be shyly ridiculing his performance as he goes along, for his own private enjoyment. This after-effort, not intended for the public, is usually pitched at the top of his voice, so high that his voice often breaks, when the result is truly ludicrous. I am convinced that many times when we think the robin is resting between strains, he is busying himself in the manner described. His song on this occasion ran, —

1.

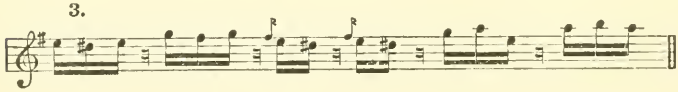


2. *Another song at daybreak.*



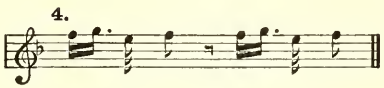
May 6, at 4 P. M., there were signs of rain, and red-breast seemed to be unusually inspired. He sang with great spirit, —

3.

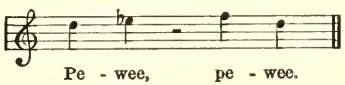


While at my work, May 8, I heard him introducing

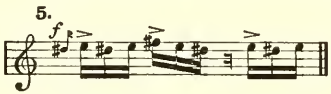
new "kinks" in his vocal twistings. He repeated them many times, almost to tiresomeness. They were, —



The morning of the 14th opened rainy, but the drops did not stop the concert of the birds. On putting my head out to catch the first of it, a pewee was singing,

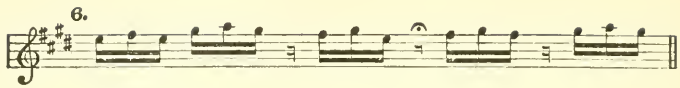


and a robin defied the shower in good set terms: —

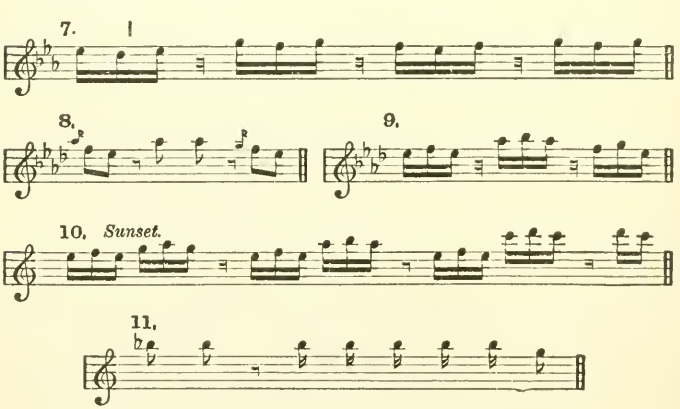


Whether he meant to sing in E major or minor, I did not decide.

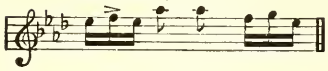
May 23 I was awake before 2 o'clock A. M., and all was still; not even a frog peeped. At the first faint coming of light the rooster crowed; and in about half an hour I heard the first bird-notes, the robin's. At this hour the robin does not burst into full song, but begins with a subdued twitter, which rapidly opens and attunes his throat for the splendid moment when, yielding himself to the fresh gladness, he puts forth all his power. The present performance was in a little maple close by my window, where, undoubtedly, he had spent the night. His song was, —



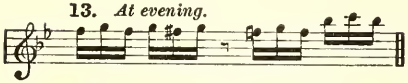
There is no mistake about this being in the major key, and a bit of choice melody. Delivered, as it was, with delightful animation, the effect was cheering to the last degree. Other voices joined, and immediately there was a grand chorus, in which, much to my amusement, the frogs and toads, silent up to this time, took a lively part, not to be outdone by the whole choiring hosts of orioles, catbirds, pewees, sparrows, and other feathered rivals. The only fault with the performance was its brevity; in a few minutes all was silent as before. The robin sings more hours than almost any other bird. His songs are short and he repeats them many times, but he is by no means stereotyped in his forms; indeed, he is fair at extemporizing when the mood takes him. A commendable variety will be discovered in the annexed melodies.



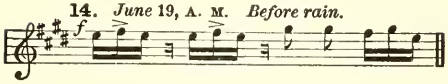
12. *June* 5, 4 P. M.



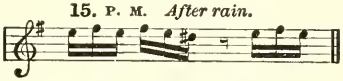
13. *At evening.*



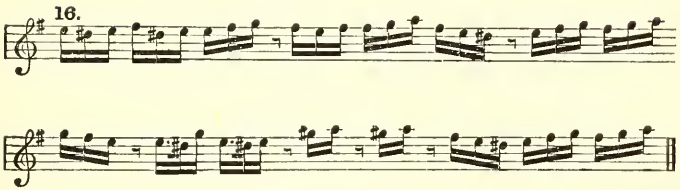
14. *June* 19, A. M. *Before rain.*



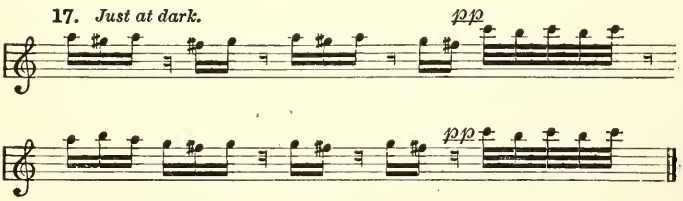
15. P. M. *After rain.*



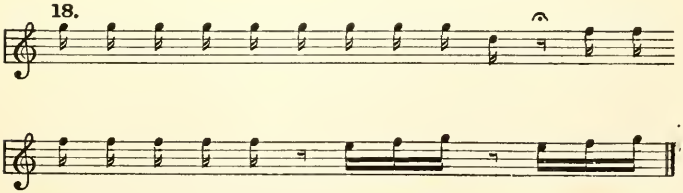
16.



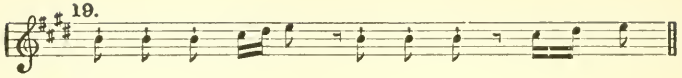
17. *Just at dark.*



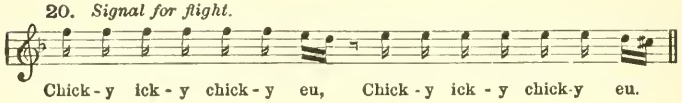
18.



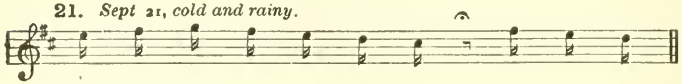
19.



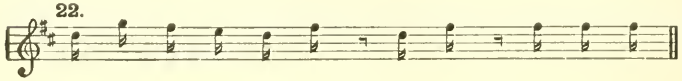
20. *Signal for flight.*



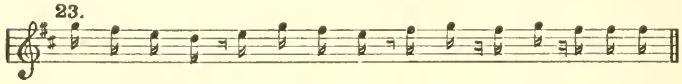
21. *Sept 21, cold and rainy.*



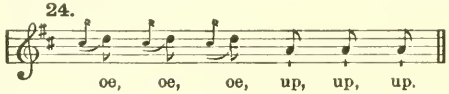
22.



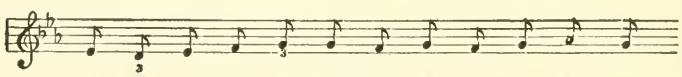
23.

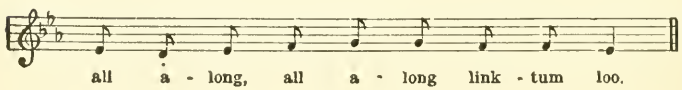


24.



From these examples it will be seen that bird-music is akin to our own; the same intervals are used, those of the major and minor keys. No. 7 brings to mind the first half of an old melody sung by the spinning-girls fifty years ago, as a substitute for counting, while reeling yarn: —



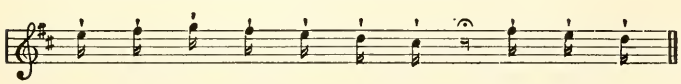


Who is the plagiarist?

The majority of singing-birds make free use of triplets; the robins abound in them. They are generally separated by brief rests; but in some instances two or three triplets are given without rests, as in Nos. 13 and 16.

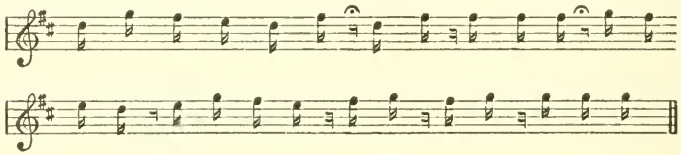
The robins sing throughout the summer, their incessant repetitions frequently becoming tiresome. They take the lead at the opening of the season, and hold it. Every morning they begin the concert, and are the principal performers; indeed, they seem to feel competent to make up the entire choir, if necessary. They are by no means our best singers, but were we deprived of them, we should miss their songs more than those of any other bird. They are the most social and domestic of all the migrating birds, belonging to the farm almost as much as do the hens and chickens. They come early and stay late; and after they are supposed to be gone for good, if you have a nice mountain ash, hanging thick with clusters of beautiful red berries, — the very gem of all outdoor ornaments at this season, — some very windy day a cloud of robins will swoop down upon it, when nothing will save it. In mitigation of his offence, I am willing to believe that the robin does not think himself a robber, but simply a high-handed taker of what he has earned by long service of song, the "provender of praise."

September 21, a cold, rainy day, when no other bird was to be seen, I heard a robin exclaim,—



He spoke with much decision and independence, as much as to say, "I am alone, but can take care of myself!" It is a point worth noticing that the farewell of the robin is very similar in style to his first salute in the spring.

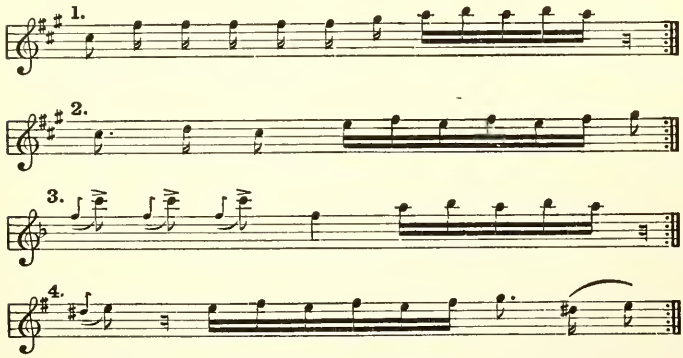
The last I saw of the robins they were collecting, at early morning, in the small trees and bushes about a pond near the grove. Very brisk, both in voice and movement, their main notes were:—



SONG-SPARROW.

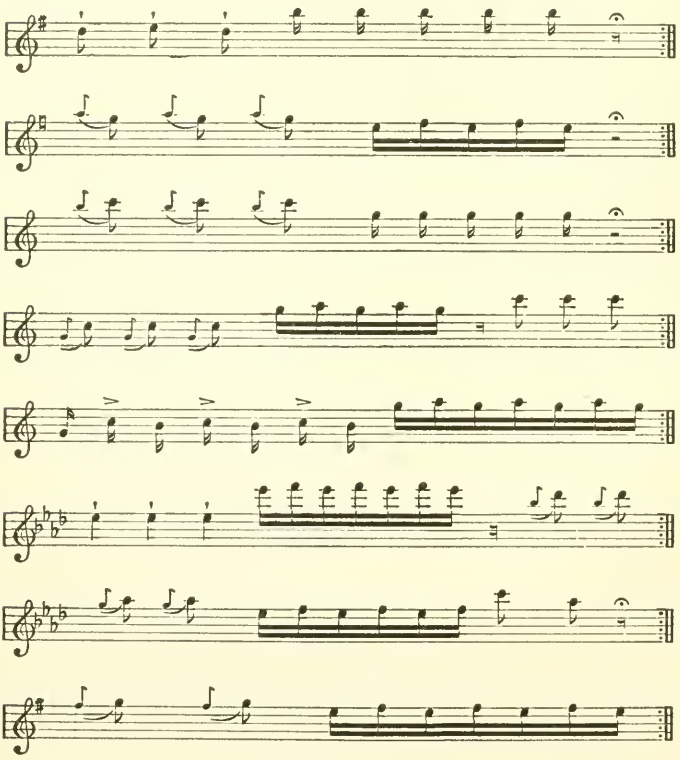
MELOSPIZA MELODIA.

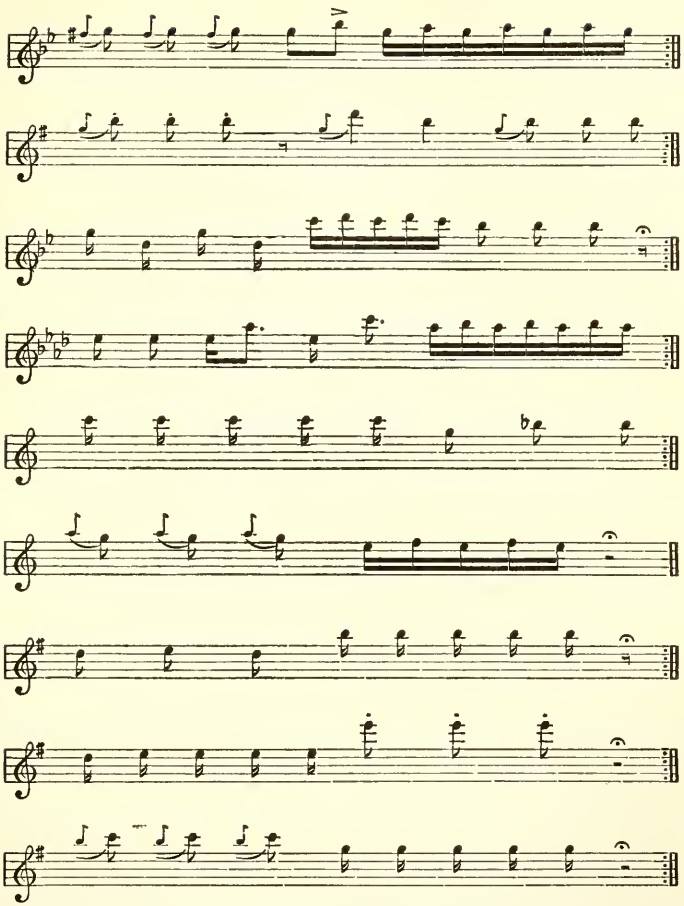
THE sparrow family is a large one. There may be twenty species, half of which, at least, spend the summer in New England. The song-sparrows are the most numerous; they sing the most, and exhibit the greatest variety of melody. Standing near a small pond recently, I heard a song-sparrow sing four distinct songs within twenty minutes, repeating each several times.



I have more than twenty songs of this sparrow, and have heard him in many other forms. He generally gives a fine trill at the beginning or end of his song. Sometimes, however, it is introduced in the middle, and

occasionally is omitted, especially in the latter part of the season. There is a marked difference in the quality and volume of the voices of different individuals. During the season of 1885 I listened almost daily to the strongest and best sparrow voice that I have ever heard. There was a fulness and richness, particularly in the trills, that reminded one of the bewitching tones of the wood-thrush. These are some of his songs: —





It will not do to say that the singers of any species sing exactly alike, with the same voice and style, and always in the same key. There is a wide difference between the singing of old and young birds. This is

especially true of the oriole, the tanager, and the bobolink. The voice of a bird four years old is very much fuller and better than that of a yearling; just as his plumage is deeper and richer in color.

The song-sparrow comes soon after the bluebird and the robin, and sings from the time of his coming till the close of summer. Unlike his cousin, the field-sparrow, he seems to seek the companionship of man. Sitting near an open window one day last summer, as was my habit, my attention was attracted by the singing of a song-sparrow perched upon a twig not far away. Fancying that he addressed himself to me individually, I responded with an occasional whistle. He listened with evident interest, his head on one side and his eye rolled up. For many days in succession he came at about the same hour in the afternoon, and perching in the same place sang his cheery and varied songs, listening in turn to my whistles.

CHICKADEE.

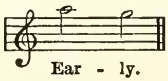
PARUS ATRICAPILLUS.

IT was a fortunate meeting of extremes when Emerson found the titmouse in the winter forest, for he went home and put his little friend on paper so surely that he can never fly away: —

> "Here was this atom in full breath,
> Hurling defiance at vast death;
> This scrap of valor just for play
> Fronts the north wind in waistcoat gray,
> As if to shame my weak behavior."

The chickadees make very free with us in frosty weather; coming about our homes, they help themselves without question. If driven from the bit of meat hung up to "keep" in the cold, they utter a few "chick-a-dee-dee-dees," and fall to again as if nothing had happened. The "chickadee" notes, however, are their chat, not their song, though sometimes the song immediately follows.

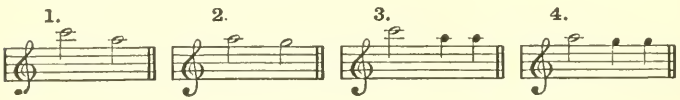
One clear, cold March morning before sunrise, I was greeted with two tones,



They thrilled me; never were purer tones heard on earth. Presently they were repeated, when I discovered

a pair of chickadees on a limb of a small tree. The song came from one of them; and when he shot up and away, he left me with a new understanding of the value of purity of tone. Nearly all small birds sing rapidly, too rapidly for appreciative hearing; but this little songster somehow has found out that one pure minim is worth a whole strain of staccato demi-semi-quavers.

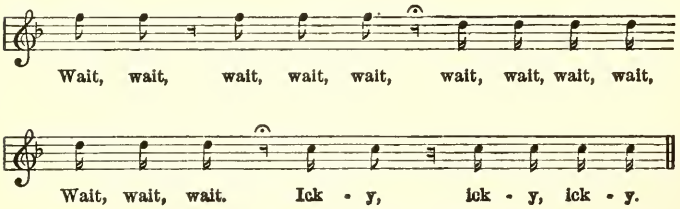
The chickadees sometimes employ a delightful form of response in their singing: —



WHITE-BELLIED NUTHATCH.

SITTA CAROLINENSIS.

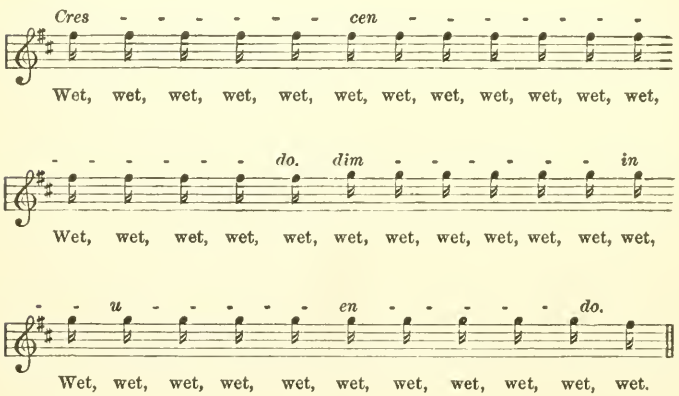
THIS is the bird that stays with us, clings to his native woods; summer and winter he is at home. During one long, very cold winter a member of this family was one of my most intimate, constant, and important friends. No degree of cold could daunt him. Early in the morning his sharp, rapid, merry notes would lend life to the grove: —



GOLDEN-WINGED WOODPECKER; FLICKER.

COLAPTES AURATUS.

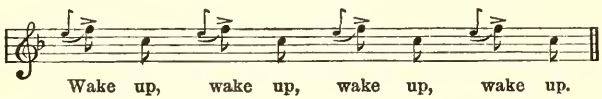
THE loud, monotonous vocalizing of this handsome bird is hardly song; still we often hear it said, "The woodwall is singing, we are going to have rain." The two-toned "rain-call" is his song, if he have one. The performance is long enough for a song, but rather narrow.



If the cuckoo, whose song is so famous, can be called a singer, this woodpecker is a songster; for he performs

oftener, longer, and louder, than the cuckoo, using the same melodic variety of a minor second, which is the least possible.

The golden-wings are geniuses at a frolic. When two or more of them are together they have a brisk chase of it round and up the trunks of the great trees and out on the big limbs, crying, —



We have no true singing-bird so large as this woodpecker.

The bright hues of the tanager and the oriole may attract the eye quicker than his, but no other of our birds displays the whole world of color in every conceivable combination. These birds are frequenters of meadows and pastures; they like to be on the ground and to dig in it. When they rise, they swing away through the air in great billowy lines of indescribable grace. Wilson takes much pains in describing the ingenuity and perseverance of these birds in digging out their nests. "I have seen," he says, "where they have dug first five inches straight forward, and then downward more than twice that distance, through a solid black oak." He further states that they work "till a very late hour in the evening, thumping like carpenters;" also that "the male and female work alternately."

The golden-winged woodpecker has many surprises in store for them that do not know him. It will be some-

what startling when he simply calls the roll of his names: —

Golden-winged Woodpecker.	Harry Wicket.
High Hole.	Flicker.
Woodwall.	Hittock.
Yucker.	Piut.
Wake-Up.	Yarrup.

Yellow Hammer.

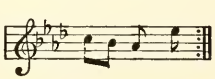
The natives about Hudson's Bay call him Ou-thee-quan-nor-ow.

MEADOW LARK.

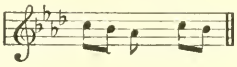
STURNELLA MAGNA.

LIKE the partridge, the meadow lark has favorite places of resort, where he stands and sings or keeps silent, as the mood takes him. His flight also resembles that of the partridge and of the quail. Probably our largest singing-bird, his voice is neither loud nor deep, some of the tones being rather sharp and weak. He lacks the vocal power of the robin, and of the oriole, a bird of not more than half his size; still his music is very charming. Wilson, comparing him with the skylark, says, "In richness of plumage, as well as sweetness of voice (as far as his few notes extend), he stands eminently his superior."

The meadow lark's song is essentially tender and plaintive. In the early dewy morning and toward evening, he will stand a long time upon a stump, a large rock, or rock-heap, singing at intervals little snatches of melody; occasionally, like the oriole and the king-fisher, giving his "low, rapid, chattering" monotones. It is a favorite pastime with him to repeat four tones many times in succession, with rests intervening:—



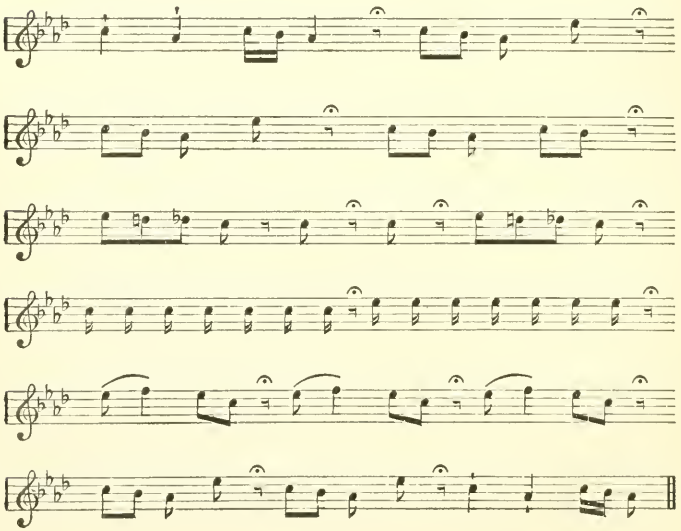
Sometimes he will add to them: —



These fragmentary strains, when connected, form an original and interesting song.

Now and then there is an exquisite, subtile tremor in the tones of this singer, no more to be described than the odor of a rose. It somewhat resembles that in the tones of the Wilson thrush as he trembles along down to the close of his quivering, silvery song.

Song of the meadow lark: —



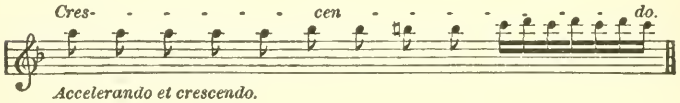
FIELD-SPARROW.

SPIZELLA PUSILLA.

THIS sparrow, less common than the song or the chipping sparrow, resembles these in appearance and habits. He is not so social, preferring the fields and pastures and bushy lots. When Wilson wrote, "None of our birds have been more imperfectly described than the family of the finch tribe usually called sparrows," he wrote well; but when he wrote of this one, "It has no song," he brought himself under his own criticism. And when Dr. Coues, on the contrary, describes him as "very melodious, with an extensive and varied score to sing from," and further, as possessing "unusual compass of vocal powers," he much better describes the song sparrow. The field sparrow is surely a fine singer, and he may have several songs. I have heard him in one only; but that one, though short, it would be hard to equal. As a scientific composition it stands nearly if not quite alone. Dr. Coues quotes Mr. Minot on the singing of this bird. "They open with a few exquisitely modulated whistles, each higher and a little louder than the preceding, and close with a sweet trill." The song does begin with two or three well-separated tones, — or "whistles," if you please, — but I discover no modulation, nor is each higher than the preceding, the open-

ing tones being on the same pitch. However, the song increases, both in power and rapidity, from beginning to end. It by no means requires "unusual compass,"— simply the interval of a minor third.

When we consider the genius displayed in combining so beautifully the three grand principles of sound,— length, pitch, and power,— its brevity and limited compass make it all the more wonderful. Scarcely anything in rhythmics and dynamics is more difficult than to give a perfect *accelerando* and *crescendo;* and the use of the chromatic scale by which the field sparrow rises in his lyric flight involves the very pith of melodic ability. This little musician has explored the whole realm of sound, and condensed its beauties in perfection into one short song.



Accelerando et crescendo.

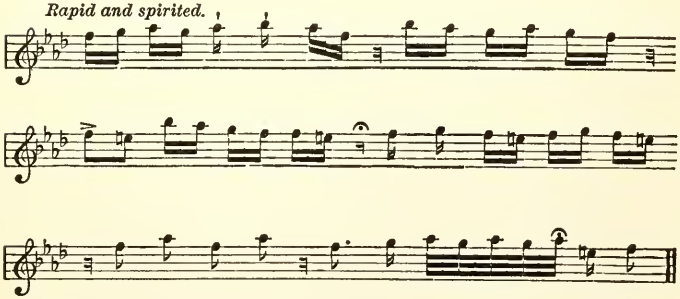
LINNET; PURPLE FINCH; PURPLE GROSBEAK.

CARPODACUS PURPUREUS.

THE linnet (this is the popular name) is a very spirited and charming singer, especially during the mating season. A careful observer tells me he has seen him fly from the side of his mate directly upward fifteen or twenty feet, singing every instant in the most excited manner till he dropped to the point of starting. The yellow-breasted chat has a like performance, and so has the woodcock.

The linnet's style of singing is a warble, but his song is not short like the songs of the warblers; it is often a protracted extemporizing, difficult to represent.

Some of the notes of the linnet: —



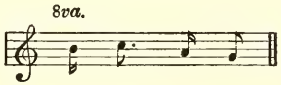
The linnet has been described as "red" and also as "purple," but really he seems to be neither. He has a reddish back and neck, and his head is almost red. The female has no red in her complexion. The linnets are social, building in our orchards, oftener in the evergreens. They are kind and peaceful birds, yet ever ready to avenge an insult to the death.

The males do not reach their full plumage till the second or third year. If caged, after the first moulting in their confinement the wild colors do not return; the reddish tint is exchanged for a yellowish cast, and so remains.

YELLOW-BIRD; AMERICAN GOLDFINCH.

CHRYSOMITRIS TRISTIS.

THE yellow-birds, frequenters of our door-yards and gardens, are of all birds the gentlest-mannered. With their heads crowned with black caps, their yellow bodies, black wings and tails, they are dainty, high-bred visitors. When singing in chorus, as is their habit, their soft warblings are expressive of great delight. In their most characteristic song, of only four notes, they are stronger-voiced, singing with distinctness and moderation. This song is performed while on the wing, and is all the more charming because of the touch of sadness that it has for the sensitive listener. The flight of the yellow-birds follows the fashion set by the woodpeckers. It is like the riding of a boat over great billows — up — down — up — in graceful curves, with a stroke of the wings for each swell, to the accompaniment of the little song, —



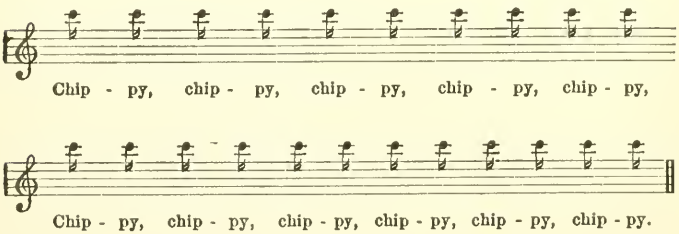
With sweep and swing from crest to crest, the song runs: —

CHIPPING SPARROW.

SPIZELLA SOCIALIS.

THIS trim little bird, one of the least of the sparrows, is not so great a singer as some others of the family; but none of them equal him in song devotion.

At the close of day he may be heard from the house-top, from the ridge-pole of the barn, from the fence or the grass stubble. Dr. Coues says he has "at times a song quite different from the sharp, monotonous trill so characteristic of spring-time," and without doubt he has; but the monotonous "trill," being a succession of rapid tones upon the same degree, can hardly be called a "trill."



To look at these notes, it would seem impossible that any performance of them could be made acceptable; the hearing of them, however, relieved by the delicate accent

and fervor of the singer, never fails to touch the heart of the listener. The chipping sparrow sings at all hours, sometimes waking in the dead of night to perform his staccato serenade; but the evening twilight hour is his favorite time. If we have a vesper sparrow, it is he.

None of our birds are more social and confiding. These sparrows come for the crumbs about the door, and with little coaxing will light on your hand for them; and if there be vines over the doorway, you will be quite likely to find the lady's nest in them, maybe only a few inches above your head as you go in and out. They prefer a bush for their summer home, but I have several times known them to build their beautiful hair-lined nests in a heavy-boughed spruce, ten or more feet from the ground.

WHITE-THROATED SPARROW.

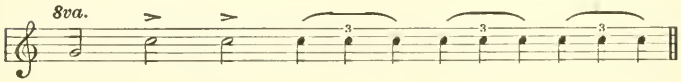
ZONOTRICHIA ALBICOLLIS.

FAMILIAR as the song of this bird is, few listeners suspect that it is sung by a sparrow. In an extreme northern town of Vermont, I often heard the song when a boy, but never the name of the singer; and I have rarely heard him named since. The knowing ones used to say the words of the song were,—

"All day long fid-dle-in', fid-dle-in', fid-dle-in'."

The little twelve-toned melody of this sparrow is a flash of inspiration — one of those lucky finds, such as the poets have — the charm of which lies in its rhythm.

Let us look at it: —

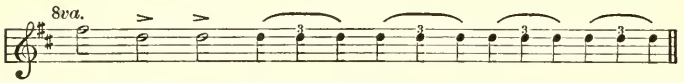


First come three long tones of equal length, forming together one-half of the song entire; then three clusters of three short tones, triplets, each cluster being equal to one of the long tones, and each of the short tones being equal to one third of one of the long tones. How simple the construction for so pleasing a performance!

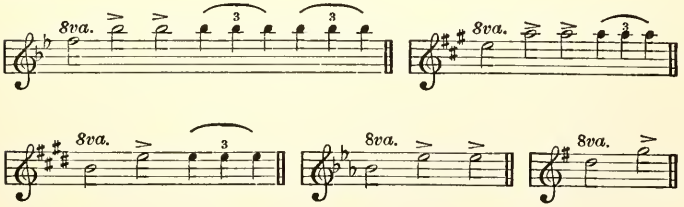
The white-throat sings moderately and with exactness; singing often, and usually with several of his fellows,

each piping away in a key of his own. Heedless of pitch, striking in just as it happens, this independent little songster sometimes finds himself at the top of his voice and at a height of sound rarely reached by any other bird. The whistling quality of the white-throat's voice and his deliberate method make his song very distinct and distinctive. The responsive singing of several performers in the still woods (and out of them sometimes), continually introducing new keys, affords a unique entertainment.

The form of the song already given is undoubtedly the true one, but I once heard the following variation: —



When the season is well advanced, the singers, seemingly grown weary of their song, begin to shorten it. At first they omit the last triplets; further on they drop the second group, then the first group, then the third long note, till finally only the first two long notes remain. There is a touch of the comic in this farewell performance, as though the singer said, "There, you know the rest."

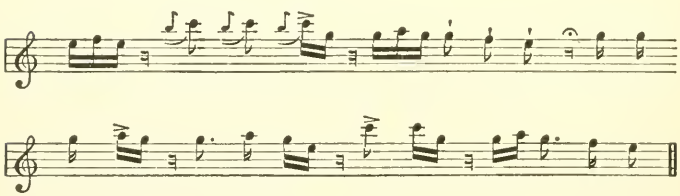


FOX-COLORED SPARROW.

PASSERELLA ILIACA.

THESE song-loving sparrows have sweet voices and a pleasing song. No sparrow sings with a better quality of tone. They reach Massachusetts, on their journey north, generally by the tenth of April. They come in small flocks, tame birds, and partial to the ground. They scratch among the low bushes, often in the fresh snow, rising frequently a few feet to sit and sing; they also sing upon the ground. They are our largest sparrows; fine-looking birds, with reddish backs somewhat like those of the brown thrush.

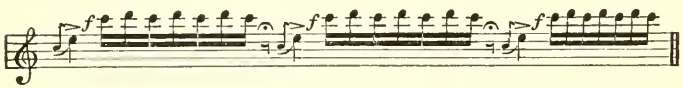
Song of the fox-colored sparrow: —



CHEWINK; TOWHEE BUNTING; GROUND ROBIN.

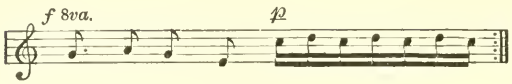
PIPILO ERYTHROPHTHALMUS.

THE song of this sprightly, showy bird, as I have heard him, consists of one long, loud tone on E or D, followed by a rather soft trill on the tonic, a sixth higher. The most striking peculiarity of the performance at the first hearing is that unless fortunate enough to see as well as hear the bird, one will be sure there are two singers, one singing the long note and the other the trill:

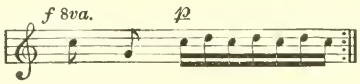


"This species seems to have a special dislike to the sea-coast." So says the close observer, Wilson; but I have found the chewink very much at home at different points close to the sea. This bird, like many others, can extemporize finely when the spirit moves him. For several successive days, one season, a chewink gave me very interesting exhibitions of the kind. He fairly revelled in the new song, repeating it times without number. Whether he stole it from the first strain of "Rock of Ages" or it was stolen from him or some of his family, is a question yet to be decided.

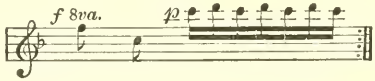
The following is an exact copy of his variation: —



Not satisfied with this, after a time he performed still another variation: —



Finally he became dissatisfied with his key, and "went up": —

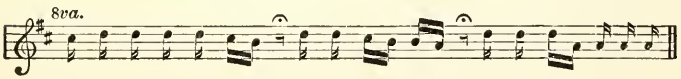


YELLOW WARBLER.

DENDROICA AESTIVA.

THE yellow warbler is a representative character, and taken all in all, is the most interesting of the warblers. He is beautiful, very active, and of engaging manners. Though he may not equal in brilliancy of color the flashing, blushing redstart, he has a charm of his own as he moves rapidly through the green foliage, singing his lively song. If sometimes in the bright sunlight it is almost too sharp, like the ringing of steel, it is the best of songs by the warblers. The yellow warblers are numerous, haunting the orchard, and the garden in city or country. They come early in May and spend the summer, often raising two families. The cow-bird cannot impose on these merry birds as safely as she can on some others; for the lady of the house is apt to build a deck over the hateful stranger-egg and fasten it down in the hold to hatch and find its hatchway out as best it may.

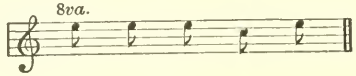
Like the songs of all the warblers, the song of the yellow warbler is brief and rapid. Though so high, it can be heard many rods: —



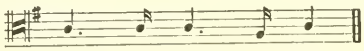
BLACK-THROATED GREEN WARBLER.

DENDROICA VIRENS.

THE richly clad black-throats, restless and almost always singing, are nearly as numerous as the yellow warblers. Their song is shorter, five tones, quite as distinct and more moderately delivered. There is something about the little song —



that inclines one to whistle it immediately on hearing it. It seems to be given as a lesson, and if the whistler be familiar with the old sea song, "Larboard Watch," he will hardly fail to discover in —



"Lar - board watch a - hoy!"

another instance of the similarity between bird melody and human melody.

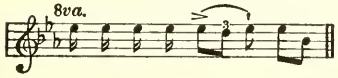
These charming little wide-awakes like the pine woods. There they nest and sing; but they often visit adjoining farms, coming close to the buildings in the fruit and shade trees. Wherever they chance to be, there is heard the frequent piping of their happy little strain.

AMERICAN WARBLERS.

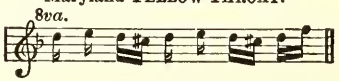
SYLVICOLIDAE.

THE numerous little birds denominated warblers are none of them great singers, and their several twitterings have a strong family resemblance. Dr. Coues, who has more than thirty varieties in his list, well remarks, "Nearly all of our 'warblers,' in fact, are misnamed, if we are to take the term as any indication of proficiency in that kind of vocalization which we commonly call warbling."

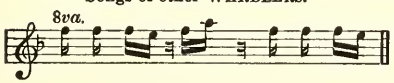
Chestnut-sided WARBLER.

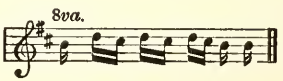


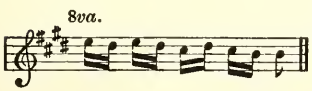
Maryland YELLOW-THROAT.

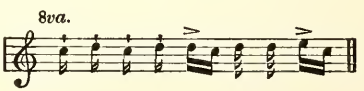


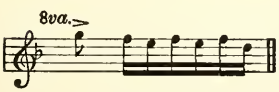
Songs of other WARBLERS.

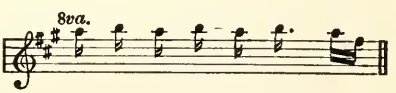


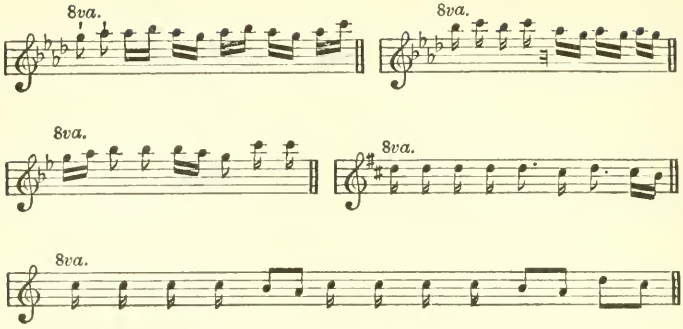








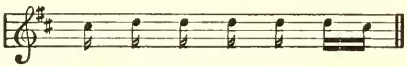



8va.
8va.
8va.
8va.
8va.

REDSTART.

SETOPHAGA RUTICILLA.

RARE is the bird in our woods as dashing as the redstart. As he runs rapidly along the limbs or makes his short flights in pursuit of insects, he is perpetually spreading his gayly painted tail, shooting flashes of fire among the green leaves. If proud of his plumage, he seems equally proud of his song, brief and monotonous as it is, and borrowed (perhaps) from his cousin, the yellow warbler: —

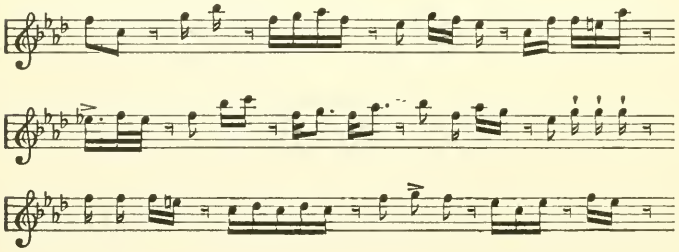


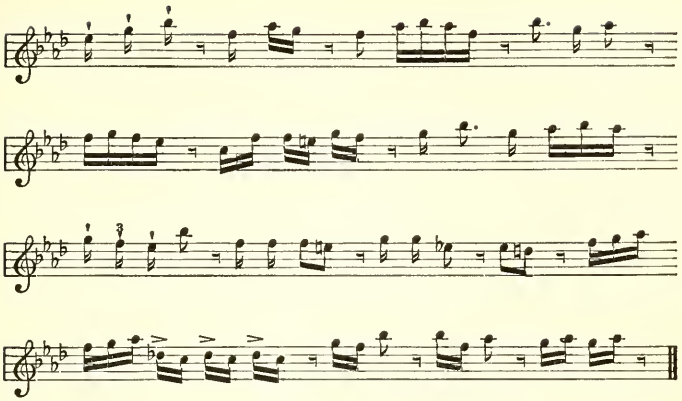
CAT-BIRD.

MIMUS CAROLINENSIS.

THIS very common bird sings early in the morning and a good part of the day. He has not a strong voice, nor has he really a tune of his own. With something of the style of the brown thrush, he is not his equal in song. The cat-bird is generally considered a mocking-bird. He does make use of the notes of different birds, delivering them in snatchy, disconnected fashion; and his performance, on the whole, is very interesting, given, as it is, in a lively manner, with an occasional tone truly sweet and musical. Much of his singing, however, is mere twitter, often little more than a succession of squeaks, too antic to be put on paper.

It is easy to trace in the cat-bird's singing the notes of the red-eyed vireo, the brown thrasher, the bluebird, the robin and the yellow-breasted chat.





The cat-bird is very active and demonstrative, especially if one approach the nest; which is commonly found in low places near a brook, in some thicket of briars or small bushes, or little alders, three or four feet from the ground. The eggs are four or five in number, and blue, very similar to the eggs of the robin.

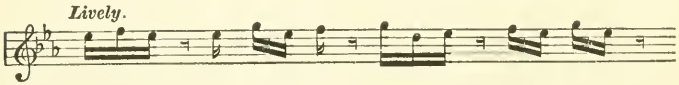
This bird received his name doubtless from the striking resemblance his common tone bears to certain cries of the cat.

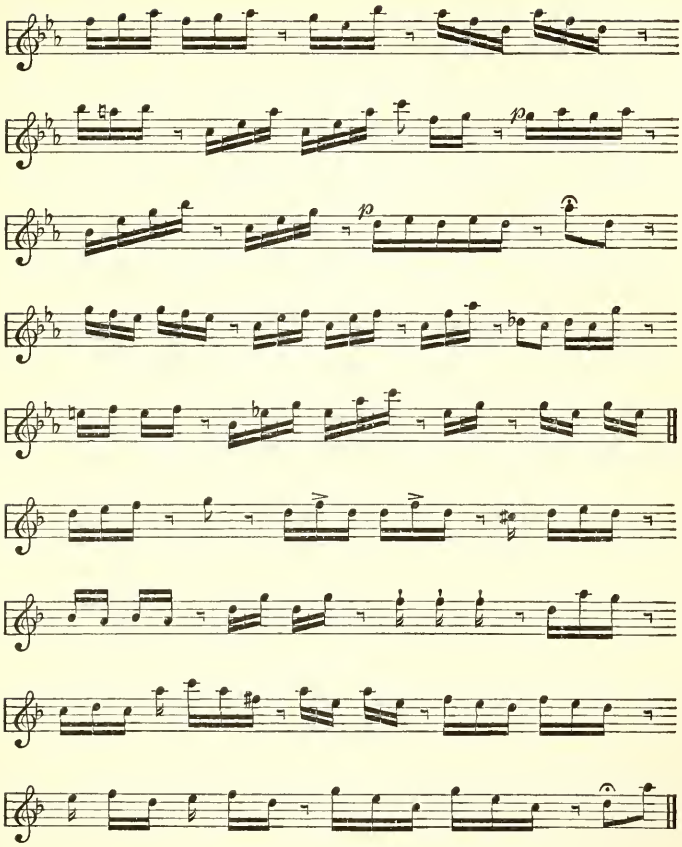
The cat-bird seems not to be a general favorite, but surely he is a well-shaped bird, dressed with good taste, too; and he plays his part well in the every-day drama of bird life.

BROWN THRUSH; BROWN THRASHER.

HARPORHYNCHUS RUFUS.

THE song of this largest and most joyous of the thrushes exhibits greater variety than that of any other member of his most musical family. Despite a lack of quality in tone, he is one of the favorites; his fame is assured. In exuberance and peculiarity of performance he is unsurpassed, unless it be by the catbird. While prone to the conversational style, he is capable of splendid inspiration. Literary folk might term him the "Browning" among birds. On a fine morning in June, when he rises to the branch of a wayside tree, or to the top of a bush at the edge of the pasture, the first eccentric accent convinces us that the spirit of song has fast hold on him. As the fervor increases his long and elegant tail droops; all his feathers separate; his whole plumage is lifted, it floats, trembles; his head is raised and his bill wide open: there is no mistake, it is the power of the god. No pen can report him now; we must wait till the frenzy passes. Then we may catch such fragments as these: —



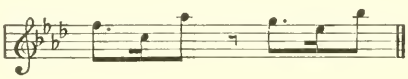


Like other thrushes and the chewink, the brown thrush is much on the ground. He is rather shy, — with all his exuberance he sings as if he were keeping something back, — but he frequently shows himself in short flights among the bushes and when crossing the road, always flying low.

WOOD THRUSH; SONG THRUSH.

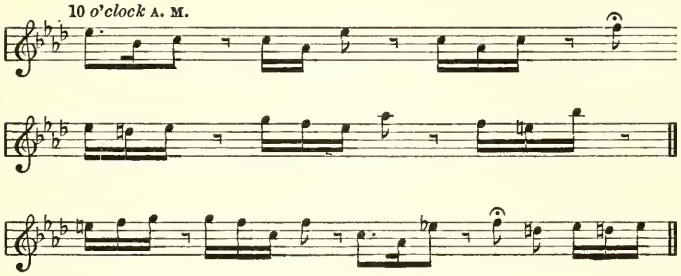
TURDUS MUSTELINUS.

THIS is probably the most popular singer of all the thrushes. He may be heard at any hour of the day during the mating and nesting season, but his best performances are at morning and evening. While his melodies are not so varied as those of the brown or those of the hermit thrush, they are exquisite, the quality of tone being indescribably beautiful and fascinating. Chancing to hear him in the edge of the woods at twilight as he sings,



in a moment one is oblivious to all else, and ready to believe that the little song is not of earth, but a wandering strain from the skies. How is it that a bird has that inimitable voice? Whence his skill in the use of it? Whence the inspiration that, with the utmost refinement, selects and arranges the tones in this scrap of divine melody? Hark!

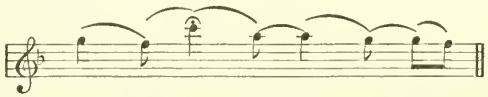
It is a new key, and the rapture is both enhanced and prolonged.



TAWNY THRUSH; WILSON'S THRUSH; VEERY.

TURDUS FUSCESCENS.

NOTWITHSTANDING Dr. Coues's silence, and Wilson's statement that this bird has "no song, but a sharp chuck," the tawny thrush is a charming singer. His little song is very beautiful, especially at evening. I think we have no bird that sings so far into the dark; hence his popular title of the "American nightingale." It is particularly difficult to describe his quality of tone. An appreciative woman perhaps nearest indicates its metallic charm when she writes, "It is a spiral, tremulous, silver thread of music." There are eight tones in the song, the last two being on the same pitch as the first two. The beginning is very unusual, the first tone being on the second degree of the scale; and there is no breaking of the delicate "silver thread" from beginning to end: —



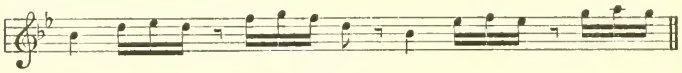
This succession of sounds, so simple to the eye, becomes, as it is performed, quite intricate to the ear; something like the sweep of an accordion through the air. The first half of the song is deliberate; the latter half is slightly hurried.

HERMIT THRUSH.

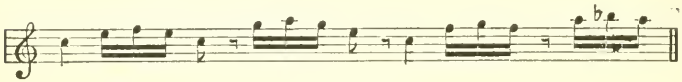
TURDUS PALLASI.

IN the case of the thrushes, as in other cases, it is not easy to find out from the books "which is which." There is a general resemblance in their voices, in their color, in their nests and eggs. Wilson says of this one, "In both seasons it is mute, having only, in spring, an occasional squeak like that of a young, stray chicken." Dr. Coues says, "He is an eminent vocalist." Mr. Flagg holds a similar opinion. After no little research in the books and in the woods, I am obliged to record him not only as the greatest singer among the thrushes, but as the greatest singing-bird of New England. The brown thrush, or "thrasher," the cat-bird, and the bobolink display a wider variety of songs; the bobolink especially, who sings a long, snatchy song, in a rollicking style altogether foreign to that of the hermit thrush. He never indulges in mere merriment, nor is his music sad; it is clear, ringing, spiritual, full of sublimity. The wood-thrush does not excel his hermit cousin in sweetness of voice, while he by no means equals him in spirit and compass. The hermit, after striking his first low, long, and firm tone, startling the listener with an electric thrill, bounds upwards by thirds, fourths, and fifths, and some-

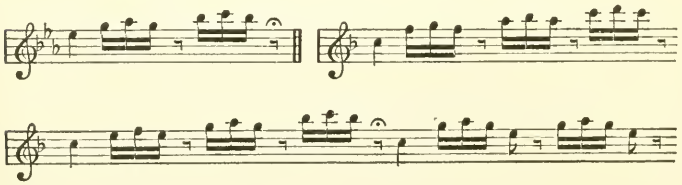
times a whole octave, gurgling out his triplets with every upward movement. Occasionally, on reaching the height, the song bursts like a rocket, and the air is full of silver tones. A second flight, and the key changes with a fresh, wild, and enchanting effect. The hermit's constant and apparently indiscriminate modulations or changes of tonic lend a leading charm to his performances. Start from what point he may, it always proves the right one. When he moves off with —

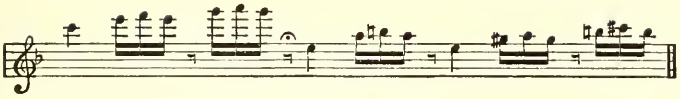


and then, returning, steps up a degree and follows it with a similar strain, —



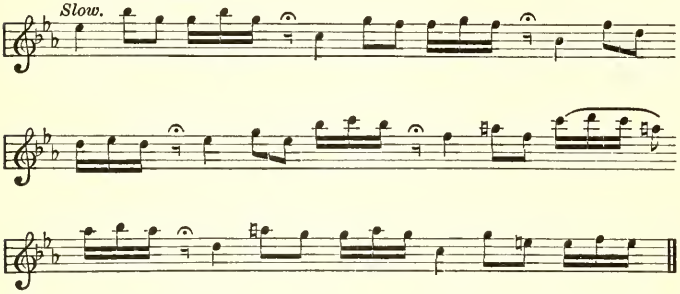
it is like listening to the opening of a grand overture. Does one attempt to steal the enchanter's notes, he is anticipated, and finds himself stolen, heart and all the senses. But it is folly to attempt a description of the music of the thrushes, of the skill and beauty of their styles of singing, and all as vain to try to describe their matchless voices.





In a deep still forest.

Slow.



OVEN-BIRD; GOLDEN-CROWNED ACCENTOR.

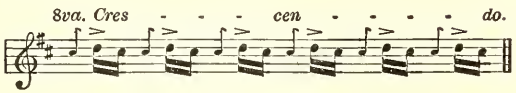
SEIURUS AUROCAPILLUS.

THE popular name oven-bird, perhaps as appropriate as any, is derived, doubtless, from the architecture of the nest, which is built on the ground, among old leaves, and roofed over like an oven, with a door on one side. It is so ingeniously constructed that no eye, not even the cow-bird's, is likely to discover it, unless it be by seeing the bird approach or leave it. The oven-bird does not fly from the nest, but runs from it with a most peculiar, light, and graceful step.

Wilson says, "The oven-bird has no song; but a shrill, energetic twitter." Other writers pronounce him a great singer; Dr. Coues declaring him the equal of the "Louisiana Thrush itself." An experienced observer assures me that he has never heard anything from the oven-birds but the one brief snatch of a song which they are forever repeating, and such has been my own experience; still, I do not question the testimony of those who claim to have heard fine songs from them.

I can hardly recall the notes of any bird that I have

heard oftener, in the grass and bushes, than the following, which are surely sung by the oven-bird: —

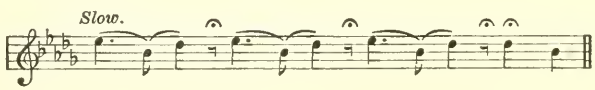


Though not a great song, such is the zeal in delivery, it keeps the woods ringing.

WOOD-PEWEE.

CONTOPUS VIRENS.

THE wood-pewee's few notes, so peculiar, so solemn, so long, so slow and gliding in movement, and so devout withal, distinguish its song sharply from that of all other birds, except, perhaps, the song of the titmouse. The effect of the pewee's singing is decidedly religious, reminding one of the worship of the "Free-willers," who, long ago, sang their hymns and half sang their prayers and exhortations on the shores of Lake Winipiseogee. The song closes with such unction that the scoffer is compelled to join in the final Amen: —



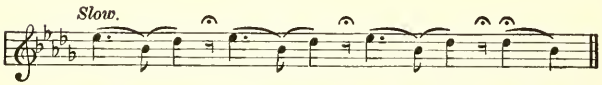
The *portamento* is used in this song with wonderful skill and power.

The wood-pewee is a tame bird, yet active and courageous. He darts and swoops through the air, frequently snapping up insects on his course. As he swiftly passes, you think you will not see him again; but he returns, and, alighting not far from the perch that he left, takes up the sacred strain. Does some strange bird happen near at the moment, the devotions are interrupted; the

intruder is chased away in the most undevout manner. This done, religious service is resumed with increased fervor. If it be the second or third week in June, his mate may be sitting near by, on four or five white eggs, or the same number of "Free-willer" fledglings, which the pious father feels it his first duty to protect.

Mr. Trowbridge has some happy lines to this little fly-catcher: —

"To trace it in its green retreat
I sought among the boughs in vain;
And followed still the wandering strain,
So melancholy and so sweet
The dim-eyed violets yearned with pain.
'T was now a sorrow in the air,
Some nymph's immortalized despair
Haunting the woods and waterfalls;
And now at long, sad intervals,
Sitting unseen in dusky shade,
His plaintive pipe some fairy played
With long-drawn cadence thin and clear, —
Pewee! pewee! pewee!"



THE NIGHT-HAWK.

CHORDEILES VIRGINIANUS.

THE night-hawk has nothing of the nature or of the habits of the hawk tribe, though, on the wing, he may resemble some of the smaller hawks. At evening twilight, or a little before or after, in search of flies and various insects abounding at that hour, constantly tacking this way and that, as the game attracts, his low ground flight is swift and angular. His pleasure flights are of a wholly different kind, novel performances, unlike those of any other bird. He then flies more moderately, frequently crying "maing" and, at the moment of utterance, rising, by two or three quick strokes of the wings, several feet straight upward. Repeated ascents finally lift him high in air; Wilson says, "sixty or eighty feet." I am sure I have many times seen him more than two hundred feet overhead when he made his plunge. This height attained, he suddenly turns downward, almost perpendicularly at first, with fixed wings and ever increasing speed till near the ground; then with a graceful bend or swoop in the form of a great horse-shoe, he shoots upward again, mounting to plunge as before. When the speed of his swoop is greatest, he produces a loud, booming sound; and this is his music.

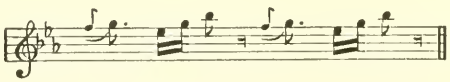
It is generally believed that the booming is made with the mouth, but careful investigation has convinced me that the mouth has nothing to do with it. This peculiar sound is produced by the pointed wings, stretched down and firmly set, cutting the air. Perhaps it is true that only the males indulge in this singular exercise.

Though the night-hawk and the whippoorwill are often taken for one and the same bird, the night-hawk never sings "whippoorwill," nor does the whippoorwill ever "boom." The whippoorwill has bristles on each side of the mouth, and a rounded tail, while the night-hawk has a forked tail and no bristles, and the plumage is differently marked. Both have the singular habit of sitting lengthwise of a limb.

WHIPPOORWILL.

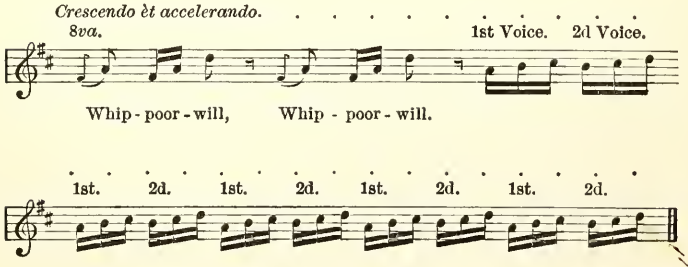
ANTROSTOMUS VOCIFERUS.

NO bird in New England is more readily known by his song than is the whippoorwill. In the courageous repetition of his name he accents the first and last syllables, the stronger accent falling on the last; always measuring his song with the same rhythm, while very considerably varying the melody — which latter fact is discovered only by most careful attention. Plain, simple, and stereotyped as his song appears, marked variations are introduced in the course of it. The whippoorwill uses nearly all the intervals in the natural scale, even the octave. I have never detected a chromatic tone. Perhaps the favorite song form is this: —

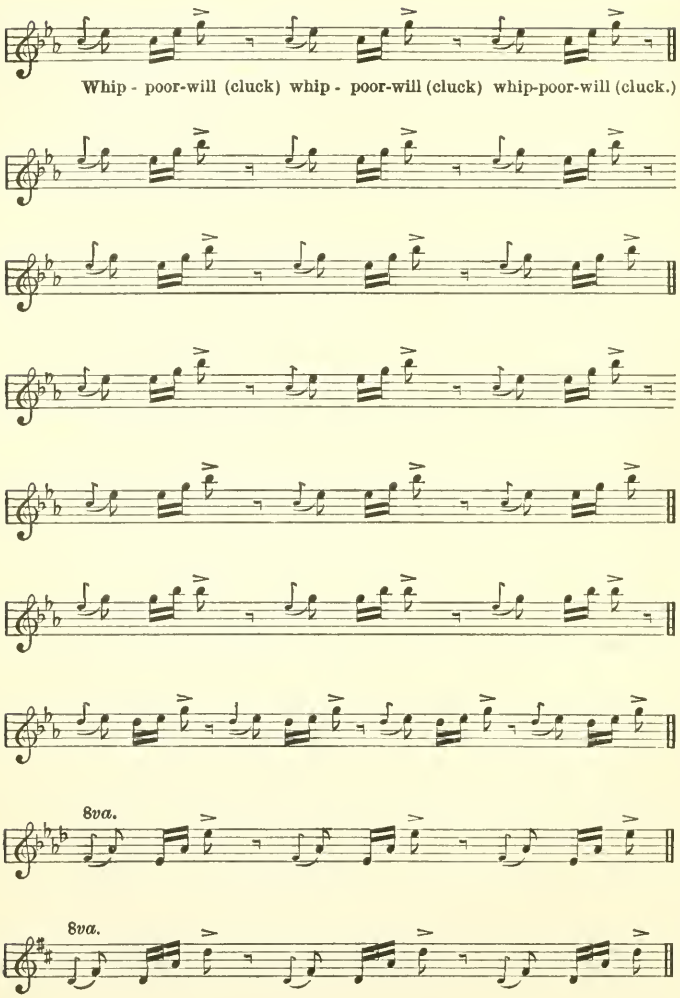


An eccentric part of the whippoorwill's musical performance is the introduction of a "cluck" immediately after each "whippoorwill;" so that the song is a regular, unbroken, rhythmical chain from beginning to end. One must be near the singer to hear the "cluck;" otherwise he will mark a rest in its place.

This bird does not stand erect with head up, like the robin, when he sings, but stoops slightly, puts out the wings a little and keeps them in a rapid tremor throughout the song. Wilson decided that it requires a second of time for the delivery of each "whippoorwill." "When two or more males meet," he adds, "their whippoorwill altercations become much more rapid and incessant, as if each were straining to overpower or silence the other." These altercations are sometimes very amusing. Three whippoorwills, two males and a female, indulged in them for several evenings, one season, in my garden. They came just at dark, and very soon a spirited contest began. Frequently they flew directly upward, one at a time. Occasionally one flew down into the path near me, put out his wings, opened his big mouth and hissed like a goose disturbed in the dark. But the most peculiar, the astonishing, feature of the contention was the *finale.* Toward the close of the trial of speed and power, the unwieldy name was dropped, and they rattled on freely with the same rhythm that the name would have required, alternating in their rushing triplets, going faster and faster, louder and louder to the end.



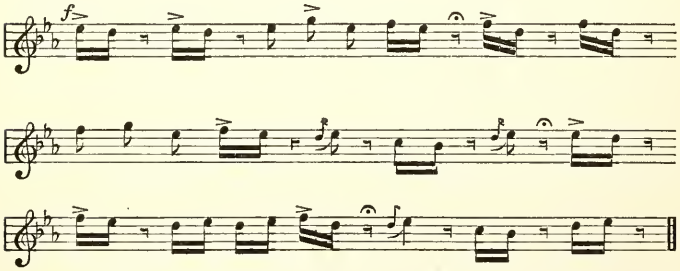
Various melodic forms: —



BALTIMORE ORIOLE.

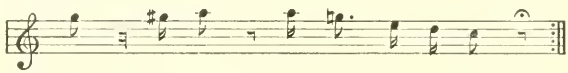
ICTERUS BALTIMORE.

OF the Baltimore oriole, every whit American, it is difficult to speak without seeming extravagance. He is the most beautiful of our spring visitors, has a rich and powerful voice, the rarest skill in nest-building, and is among the happiest, most jubilant of birds. The male generally arrives here a few days in advance of the female — the first week in May; though last spring (1884) I did not see the oriole till early on the morning of the 15th. He had just arrived, and determined to make up for lost time, he set the whole neighborhood ringing: —



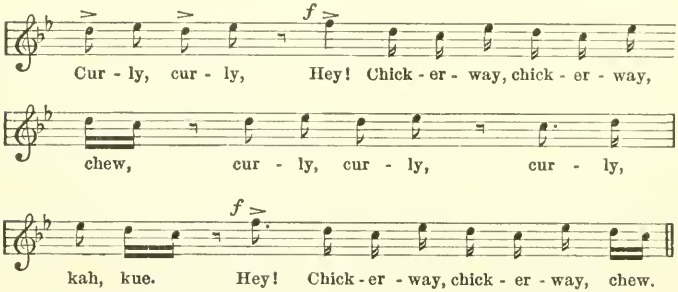
Hardly a songster, the oriole is rather a tuneful caller, a musical shouter; nevertheless, as will appear, he some-

times vents his high spirits in ingenious variations indicative of superior possibilities. Years ago I heard, from a large, tall elm standing in an open field, a strain the beauty of which so struck me that it is often wafted through my mind to this day. It was the oriole's voice, but could it be his song? —



It proved to be, and it became with me a favorite argument for the old form of the minor scale — the seventh sharp ascending, natural descending.

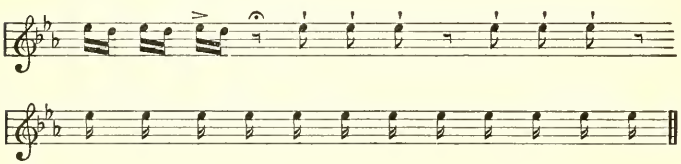
But a still greater deviation from the usual vocal delivery of orioles was noticed in Dorset, Vermont, on the 22d of May, 1884, the new song continuing through the season. A remarkable feature of the performance was the distinct utterance of words as plainly formed as the whippoorwill's name when he "tells" it "to all the hills."



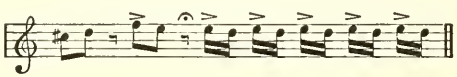
While listening to this song I could not help thinking that the bird had been trained. He invariably attacked the *forte* "Hey!" in the climax, as if he had a full

sense of the exclamation. We hoped the wandering minstrel would summer in our grove of maples, but he passed on, visiting the neighbors as he went, finally taking quarters less than a third of a mile away. Nearly every day during the season, however, we were greeted with at least one vigorous "Hey! chick-er-way, chick-er-way, chew!"

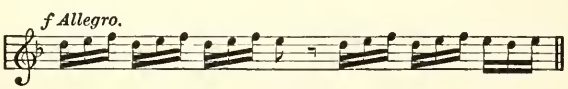
The oriole, when about to fly, gives a succession of brisk, monotonous notes, much like those of the kingfisher: —



The first notes heard from him in Dorset, one spring, were: —



Long after the foregoing sketch was written, having decided meanwhile that my study of the oriole was finished, one bright summer morning in central New Hampshire a bird dashed into a maple directly overhead and sang: —



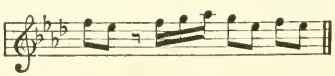
It was an oriole.

SCARLET TANAGER.

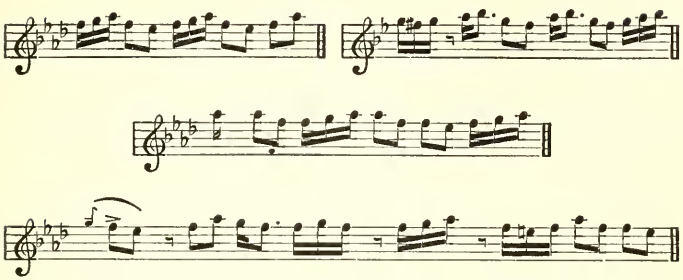
PYRANGA RUBRA.

THE tanager, the Baltimore oriole's only rival in beauty, is the less active, the less vigorous charmer of the two, and has less vocal power; but it would be difficult to imagine a more pleasing and delicate exhibition of a bird to both eye and ear than that presented by this singer, in scarlet and black, as he stands on the limb of some tall tree in the early sun, shining, and singing, high above the earth, his brief, plaintive, morning song. The tanager's is an unobtrusive song, while the percussive, ringing tones of the oriole compel attention. The tanager can sing in the forest with only his fellow-birds for audience; the oriole must be out, near the earth, among men, to be seen and heard of them.

For three successive years I found the tanagers in three different States, but not a note from one of them. In the spring of 1888, however, a beautiful singer greeted me, one summer morning, from the top of a tall oak near the house. He paid frequent visits to the same tree-top during the entire season, and generally sang the same song, beginning and ending with the same tones:—



Still, like other birds, he had his variations: —



These were all June songs, the last two being sung late in the afternoon.

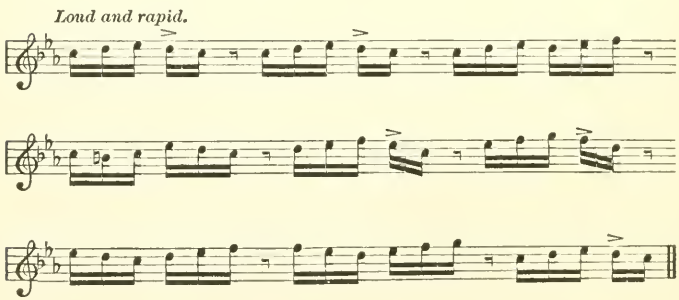
Though the singer's home was in the near woods, we did not discover the nest of his mate. Erelong there came a time of silence, and an absence of flaming plumage; and finally, a family of tanagers, undoubtedly ours, — male and female and three unfinished young tanagers of a neutral olive tint, — were about our grounds in the last days of August, evidently preparing to leave for their home in the tropics. The husband and father had doffed both his "singing-robe" and his garment of scarlet, and wore in silence a travelling-dress of mixed pea-green and willow-yellow. More desirous than ever to avoid notice, there was about him a most captivating air of quietness and modesty.

ROSE-BREASTED GROSBEAK.

GONIAPHEA LUDOVICIANA.

I HAVE had several interviews with this bird in different states, but never when prepared to take more than his key-note; so I give his song mostly from memory, feeling confident, however, of the accuracy of the main features and the spirit of it.

The black and white dress of the grosbeak, his breast adorned with a brilliant rose star, instantly attracts the eye; and his loud, ringing song as surely arrests the ear. He sings rapidly and energetically, as if in a hurry to be through and off. No bird sings with more ardor. While on paper his song resembles the robin's, and the key of E flat major and its relative minor are common to both, the voice and delivery are very unlike the robin's.



I am told that this bird has also a very musical whistling call.

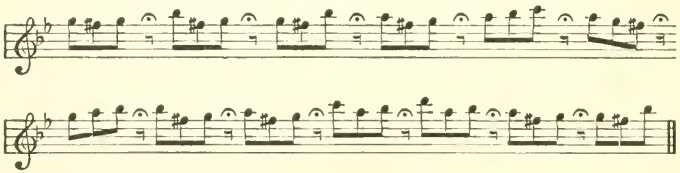
I found the grosbeaks in Belknap County, New Hampshire, in June, 1886, and in St. Lawrence County, New York, in June, 1887.

In their fall migrations they go in flocks, occasionally calling upon the farmers for food, appearing as tame and as much at home as if they had been raised by them. Flocks have passed through northern New Hampshire on their journey South in December, paying leisurely visits to the cider mills for the apple-seeds in the cast-off pumice, apparently very little concerned about the cold.

RED-EYED VIREO.

VIREO OLIVACEUS.

THIS lively, tireless singer, running rapidly after insects in the tops of the forest trees, singing as he goes, is heard more hours in a day and more days in the season than any other bird. There is no difficulty in distinguishing him, the bird so easy to hear and so hard to see. The clear, high tones of his rich voice are a constant repetition of a few triplets, but so ingeniously arranged as not to become wearisome: —



This illustration, containing the substance of the red-eyed vireo's song, has much in common with the music of other birds. The nest is after the fashion of the oriole's, hanging, as I have found it, beneath the fork of small beech limbs, five or six feet from the ground. It is a nice little pocket, as the cow-bird well knows.

YELLOW-BREASTED CHAT.

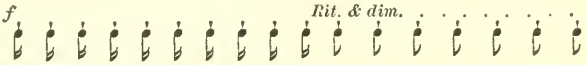
ICTERIA VIRIDIS.

AS one approaches the haunts of the yellow-breasted chat, the old rule for children is reversed,— he is everywhere heard, nowhere seen. Seek him ever so slyly where the ear has just detected him, instantly you hear him elsewhere; and this with no sign of a flight. The chat revels in eccentricities. Some tones of his loud voice are musical, others are harsh; and he delights in uttering the two kinds in the same breath, occasionally slipping in the notes of other birds and, on some authorities, imitating those of quadrupeds. I have discovered in his medleys snatches from the robin, cat-bird, oriole, kingfisher, and brown thrasher. Wilson refers to his "great variety of odd and uncouth monosyllables." I have detected three such, "char," "quirp," and "whir;" and they were given with distinctness.

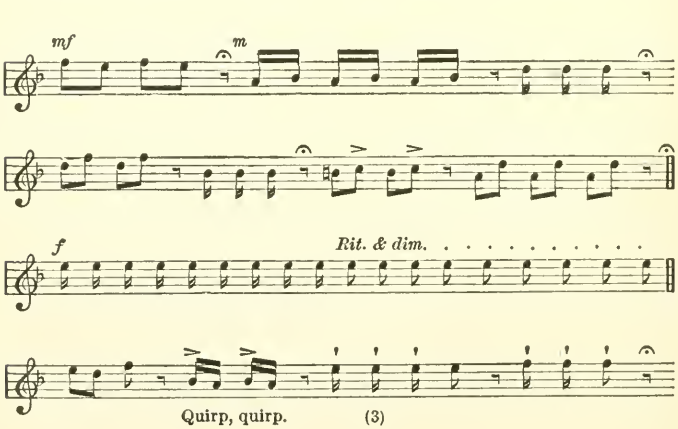
The male birds, generally preceding the females in their migrations, locate and at once begin a series of vocal and gymnastic exercises. A marked example of these performances is a jerky flight straight upward perhaps fifty feet, and a descent in the same fussy fashion. The favorite time is just before dusk; but if there be a moon, a carousal of some sort goes on all night, — the evident

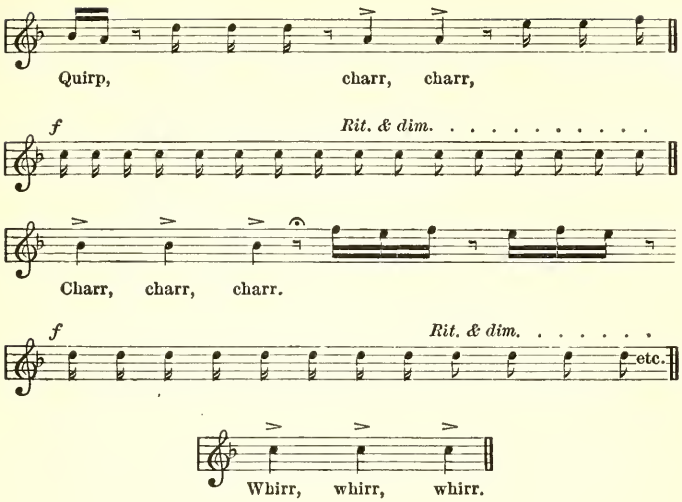
intention being to let no migrating lady-chat pass without a hearty invitation to cease her wandering and to accept a husband and a home.

After all, the chat can hardly be said to have a song. The longest strain that I have heard from him is without melody, closely resembling the rhythmic movement of the yellow-billed cuckoo's effort, but wholly unlike it in quality of tone. He will burst out with loud, rapid tones, then suddenly retard and diminish to the close:



I have heard this strain many times in the course of an hour, and am satisfied that it has no one pitch or key. The following are the principal notes of this chat, but it is not to be understood that they always come in like order: —



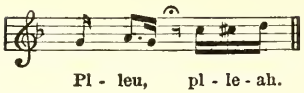

Quirp, charr, charr,
f
Rit. & dim.
Charr, charr, charr.
f
Rit. & dim.
etc.
Whirr, whirr, whirr.

BOBOLINK.

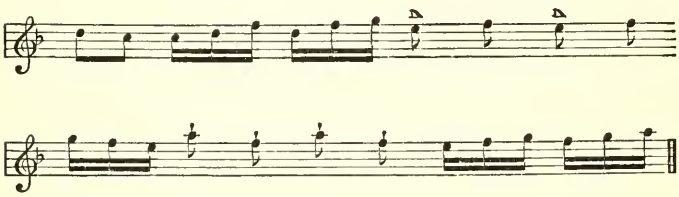
DOLICHONYX ORYZIVORUS.

THE mere mention of his name incites merriment. Bobolink is the embodiment of frolic song, the one inimitable operatic singer of the feathered stage. Though the oriole has a stronger and more commanding voice, and the thrushes far surpass him in deep, pure and soul-stirring tones, he has no rival; even the mocking-bird is dumb in his presence. In the midst of his rollicking song he falls with bewitching effect into a ventriloquous strain, subdued, as if his head were under his wing; but soon the first force returns with a swell, and he shoots up into the air from the slender twig upon which he has been singing and swinging in the wind, plying just the tips of his wings to paddle himself along in his reckless hilarity, twisting his head this way and that, increasing in ecstasy till he and his song drop together to the ground.

During his short but glorious reign bobolink takes the open meadow, the broad sunlight all day long. When he would sing his best, he invariably opens with a few tentative notes, softly and modestly given, as much as to say, "Really, I fear I'm not quite in the mood to-day." It is a musical gurgling: —



Then the rapturous song begins, and a gradual *crescendo* continues to the end. A few of the first notes of the song proper are, —



His tonic is F major or D minor, and he holds to it, his marvellous variations being restricted to the compass of an octave, and the most of his long song to the interval of a sixth. A long song and a strong song it is, but though the performer foregoes the rests common among other singers, like the jeweller with his blow-pipe, he never gets out of breath. We must wait for some interpreter with the sound-catching skill of a Blind Tom and the phonograph combined, before we may hope to fasten the kinks and twists of this live music-box.

Perhaps we have no more interesting, more charming, summer guest. When Nature clothes the fields with grass and flowers, he throws aside his common brown wear for new plumage, gay as it is unique. This striking change is a new birth; he neither looks, acts, sings, nor flies as he did before, nor could you guess him out. In

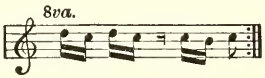
both heart and feather he is brightness itself. Most birds are dark above and light below; this bird, in the new birth, takes the exact reverse. His breast and lower parts are black, his back, neck, and crown white, shaded with yellow seams. He reaches New England about the middle of May, with his plumage perfect and his song come to fulness.

INDIGO-BIRD.

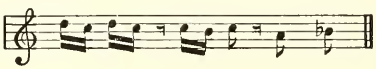
CYANOSPIZA CYANEA.

I HAD very little acquaintance with this bird, and knew nothing of his singing, till I sought him for study in a sunny nook near the entrance of the beautiful cemetery at Lynn. There a pair spent the season, giving me frequent opportunities to listen to the singer. His song was brief, plain, and without variation, and I supposed it to be the family song; but to my surprise, though I have heard indigo-birds sing many times since, not one of them sang that first song, the only one I have been able to copy.

The exact tones were, —



At first the tonic was not quite distinct, but after several performances, I caught this: —



The conclusion then was that the key was F. In the repetitions the last two tones were added about one time in six, — just often enough to keep in mind the true

key, which by the constant use of sharp four might be lost sight of.

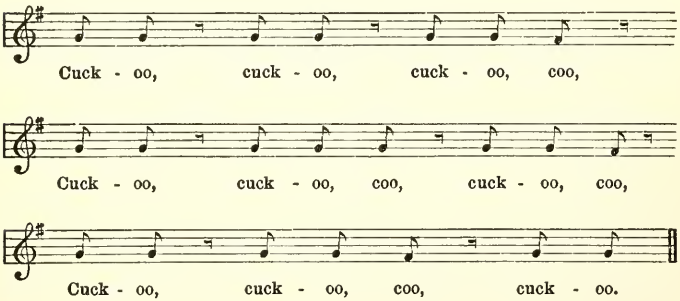
The form, then, was as follows: —

This little visitor sang frequently and earnestly; with most fervor in the hot noon-day sun, when the birds generally were silent.

BLACK-BILLED CUCKOO.

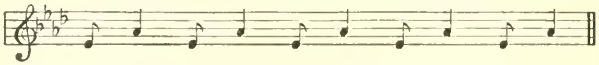
COCCYGUS ERYTHROPHTHALMUS.

IT is the black-billed cuckoo whose song, with very little merit, has become famous. It must be the low pitch, the solemn manner of delivery, and the quality of tone that have attracted the attention of the writers; for there is little variety in the rhythm and the least possible in the melody. The rather doleful, straightforward repetition of the singer's name is not heard every day; the cuckoo, too, has his moods.

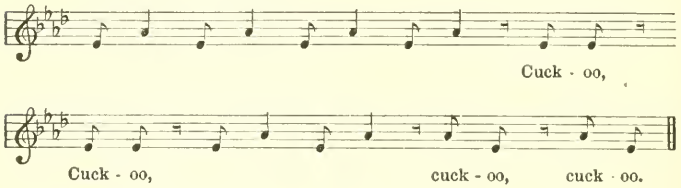


I have heard this bird nearly every summer of my life, and never any departure from the old, monotonous strain until recently (1888.) Early one June morning, sultry and warm, a bird was exercising his voice in a manner

that set me on the alert; it was the voice of a cuckoo, but not the cuckoo's song: —



At first thought, it was some bird that had practised under a cuckoo master. It was an anxious moment, but presently all was settled: —

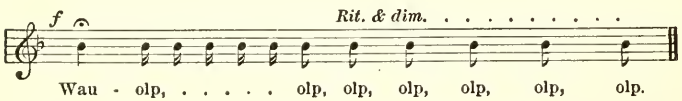


The instant I heard "cuckoo," more especially the second one, giving the interval of a fourth, I experienced a thrill of satisfaction such as no similar discovery had afforded. Other ears, sharper than mine, had heard all, unknown to me; and there was great rejoicing, — the cuckoo was learning to sing.

YELLOW-BILLED CUCKOO.

COCCYGUS AMERICANUS.

THE yellow-billed cuckoo, though he tries hard to make a showing of vocal talent, succeeds only in producing a slovenly, guttural blubbering, with barely tone enough to give positive pitch. The beginning of this effort is a sepulchral and somewhat protracted sound, which bursts into several rapid, boisterous bubbles, followed by others softer and slower, farther and farther apart.



The yellow-breasted chat exhibits the same rhythmic peculiarity in his chattings, and so does the woodpecker, drumming on a board or dry limb for the mere sound of it; but in quality nothing can be compared with this slopping performance, unless it be that of the loose-mouthed hound lapping from a pan of milk.

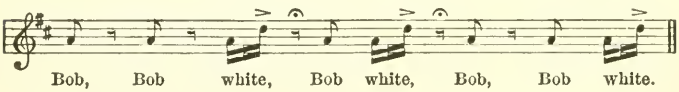
The cuckoos, graceful, beautiful birds, and ever rapt in solemn revery, are solitary voices, seldom heard more than one at a time.

QUAIL; BOB WHITE.

ORTYX VIRGINIANUS.

THE quail is said to be a general inhabitant of North America, but familiar as I have been with almost all parts of Vermont for more than thirty years, I have seen only one quail in the State, and he was evidently a "tramp." I heard him just at night, the first day of July, 1884. Did not get sight of him till the next morning, when he came out into the sun, stood on the top rail of a fence, warmed himself, and whistled his spirited, forceful tune, his solid little body swelling and throbbing at every note, especially when he rose to the tonic.

I was prepared for him, and made an exact copy of what he gave me: —



After the performance he stood, evidently listening for a reply; none came, and without another note he disappeared, to be seen no more.

The quail is about one-half the size of our partridge, and resembles it in plumage and style of flight. It seems a little strange that the time of incubation should be four

weeks, while the partridge and the domestic hen sit only three weeks. A nest that I found in Iowa in 1874, on the ground, seemed rather small and too deep, the sixteen eggs being piled one upon another for at least three layers. I was told that they were all sure to hatch.

Our eastern quails are plump, fine-looking birds; but there are two varieties in California, the "mountain quail" and the "valley quail," more beautiful than ours.

RUFFED GROUSE; PARTRIDGE; PHEASANT.

BONASA UMBELLUS.

THE peculiar interest in the partridge is owing to its close kinship with our domestic fowls. The wild and the tame hens look alike and act alike; their habits are similar; their eggs differ only in size; and both prefer nests on the ground. They gather their chickens under their wings, and call them with like clucks. The partridge seems to have an appreciation of all this, and delights in coming near our buildings, even lighting upon them and on the well-curb, and flying down into the door-yard. Not long since, a young miss of our village drove one into a shed, and caught it in her hands.

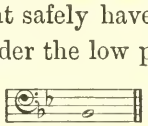
Living for more than thirty years in a grove, I have had interesting experiences with these birds. One evening last summer, on going just at dark to see what disturbed a hen grouping her chickens out-of-doors, I found a partridge sitting in her nest, refusing to be driven out by the proprietor, who was both picking it and striking it with her wings. I took it up, carried it into the house, examined it, and placed it on the floor. It was full grown and plump, but appeared to be unable to stand,

lying quite motionless, as is the habit of the young in time of danger. The next morning, when I opened the door of the wood-house, where it had spent the night, instantly it hummed by my head and disappeared. (The partridge has a rapid flight, and no bird surpasses it in swift sailing.) What caused this partridge to seek the nest of the brooding hen at that hour is something of a mystery; it may have been hotly pursued by an owl.

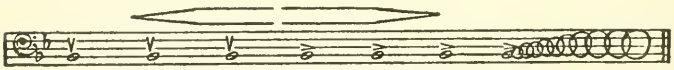
But it is of the musical powers of the partridge that I wish to speak. One spring the neighboring children came in companies to see a partridge on her nest close by my barn. The novel sight was highly entertaining, but their eyes opened wider still when they saw and heard the performances of her mate on his favorite log. During the time the hen was laying and sitting, he often gave us the "stormy music of his drum." It was small trouble to arrange bushes on a fence near by, so that one could creep up unseen and get a full view of the gallant thunderer perched on a knotty old hemlock log, mossy and half-buried in the ground; and "children of a larger growth," as well as the boys and girls, availed themselves of the opportunity. Of the many who saw him in the act of drumming, I do not recall one who had a correct idea beforehand of the way in which the "partridge thunder" is produced. It was supposed to be made by the striking of the bird's wings either against the log or against his body; whereas it was now plainly to be seen that the performer stood straight up, like a junk bottle, and brought his wings in front of him with quick, strong strokes, smiting nothing

but the air, not even his "own proud breast," as one distinguished observer has suggested.

Wilson thinks the drumming may be heard nearly half a mile. He might safely have doubled the distance; though when we consider the low pitch, B flat, second line



in bass staff, the fact is surprising. The tones somewhat resemble those of any deep drum, being very deceptive as to distance, often sounding near when far off, and far off when near. I describe the drumming as a succession of thumps, the first dozen of which may be counted. The first two or three are soft and comparatively slow; then they increase rapidly in force and frequency, rushing onward into a furious whir, the whir subsiding in a swift but graduated diminish. The entire power of the partridge must be thrown into this exercise. His appearance immediately afterward affirms it as strongly as does the volume of sound; for he drops into the forlornest of attitudes, looking as if he would never move again. In a few minutes, however, perhaps five, he begins to have nervous motions of the head; up, up, it goes, and his body with it, till he is perfectly erect, — legs, body, neck, and all. Then for the thunder once more: —



The partridge, as the bass drummer, is an important member of the feathered orchestra.

GREAT NORTHERN DIVER; LOON.

COLYMBUS TORQUATUS.

THE loon is not a singer, but his calls and shoutings exhibit so great a variety of vocal qualities that we must consider him a member of Nature's chorus.

In the summer of 1887, I spent a few weeks on the borders of Trout Lake, St. Lawrence County, New York. This beautiful little island-dotted lake, some three miles long, has been inhabited for years by three or four pairs of loons. There they lay their eggs and rear their young, and there I found a good opportunity to study them. On one occasion a small party of us discovered a nest. When we were yet a good way off, the wary sitter slid from sight into the water, darted along beneath our boat, and was far out into the lake before she came to the surface. The nest, simply a little cavity in dry muck, was on the ruins of an old musk-rat house, not more than eight or ten inches above the water. There were two very dark eggs in it,— never more than two are found in the nest of the loon,— nearly as large as those of a goose.

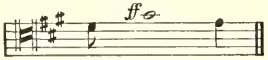
The time of sitting, as I was informed, is four weeks. Wilson says of the loons that "they light upon their nests;" but a careful observer, who had several times seen the female make her way from the water to her nest, told me that they shove themselves to it on their

breasts, very much as they push themselves in the water. I was also informed that the young are never fed upon the nest, but are taken to the water on the back of the mother, where they remain and are fed for a time, and then are launched upon the waves for life. At this age one can row up to them and take them in the hand, which they delight in giving hard nips with their long, limber bills; but when a month old they seem as wild and cunning as their parents.

I had several lively frolics with a pair about that age. They were already expert divers and could swim many rods under water. As we neared them in the boat great excitement was manifested by both old and young; the little ones dived in a flash and the parents made off rapidly, shouting for us to follow them. How they knew the direction the young ones took under water I cannot say; but they were sure to take quite another course. After learning their trick we turned to go from them, when suddenly there was a furious dashing and splashing just behind us, and in a moment more one of them rushed by, very near us, both flying and swimming, with wings in the air and feet in the water. He swept by us with a noise like a steamboat, but no boat could equal his speed. At every stroke of his wings he smote the water as well as the air. It is the opinion of many that the loon uses the wings under water, which is probably the case.

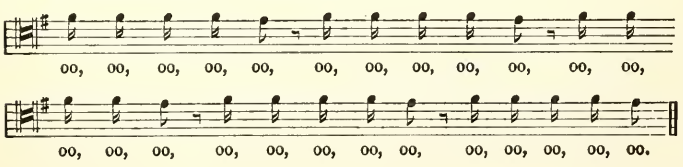
When the family discovered that we were only at play with them, they became quiet; but presently there went up a strange wild cry of three tones, the second one being long and loud, and all so much like the call of the human

voice that no sensitive person could hear them without surprise and emotion: —



Wilson thought the European divers to be of a different species from the American divers, they differed so much in size. He cites a European specimen that weighed sixteen pounds against the usual weight of our divers, which he puts at eight and a half pounds. The point of size would not seem to be well taken, for I have seen in the collection of Mr. Vickary, the taxidermist of Lynn, the body of one of our divers which weighed twelve pounds; and Mr. Vickary informs me that one was once sent to him which weighed seventeen pounds.

The loon is a born aristocrat. He is no trifler: everything he does bears an intellectual stamp. A solitary, mating only with the elements, he is master of winds and waves, sitting the waters with sovereign grace and dignity, equally unconcerned in calm and tempest. Surprised by danger, he dives fearlessly and swims the depths with incredible swiftness and for an astonishing length of time, finally emerging far away. Then, if the attractions of his other element inspire him, he rises and flies rapidly through the upper air, shouting over and over his characteristic five tones: —



GREAT HORNED OWL.

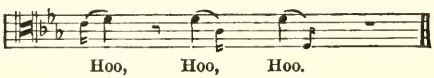
BUBO VIRGINIANUS.

"WHO ever heard an owl sing? is asked in derision," says a delightful writer on natural subjects; and he himself seems almost willing to acknowledge that the owl does not sing, and even to doubt his hoot. However it may be elsewhere, up here among the Green Mountains owls hoot, and hoot well, with deep, strong voices that may be heard distinctly, of a calm evening, for a mile or more.

One winter, after six weeks of cold, perhaps the severest in fifteen years, the weather moderated, and the 3d of March was comparatively a mild day. An owl felt the change, and in his gladness sent down ponderous vesper notes from the mountain, which, as they came booming across the valley, bore joy to all that heard them.

The owl did not change the weather; the weather changed the owl. After all that has been said for and against the ability of inferior creatures to foretell changes of weather, the sum of our knowledge amounts to about this: the senses of these beings are keener than our own, enabling them to feel the changes sooner than we can, and consequently to get a little before us with their

predictions. On the present occasion, though it was almost dark, the guinea hens chimed in with their rasping voices, and the turkeys added their best gobbles in happy proclamation of the warm time coming. The owl gave three distinct hoots in succession, repeating them at intervals of about two minutes at first, afterwards with longer pauses. The first of these tones was preceded by a grace note; the second was followed by a thread-like slide down a fourth; and at the close of the third was a similar descent of an octave.



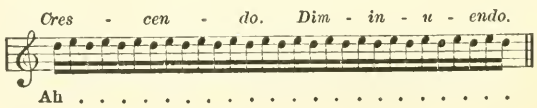
Neither slide, however, ended in a firm tone.

White of Selborne says that one of his musical friends decided that, with a single exception, his owls hooted in B flat; while a neighbor found the owls about the village hooting in "three different keys, — in G flat or F sharp, in B flat, and A flat." This Yankee owl, true to the instincts of the soil, hooted in a key of his own, E flat.

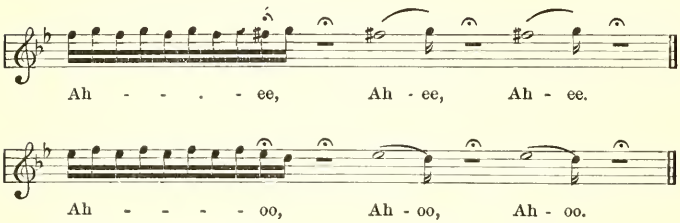
MOTTLED OWL; SCREECH-OWL.

SCOPS ASIO.

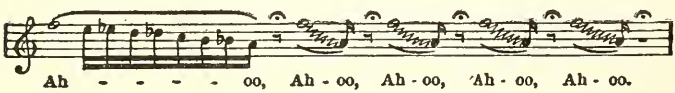
THE little screech-owl is perhaps the best musical representative of the owls. Indeed, in point of individuality of style, this artist stands alone, and must be ranked as a singer. To be sure, he has nothing of the spontaneous joy of the robin, of the frolic flow of the bobolink, nothing of the clear, clean vigor of the oriole; but he surpasses them all in tender, dulcet sentiment. Never attempting a boisterous strain, his utterances are pensive and subdued, often like a faint cry of despair. Chary of his powers, the screech-owl cuts his programme tormentingly short; and it is only after many trials that one is able to collect the disjointed strains that make his medley entire. Just at dark, some pleasant evening, you will hear his low, faint tremors. At first they may be heard perhaps every other minute, then the interim gradually lengthens, until by nine o'clock his pauses become intolerably long. The tremors or trills are given with a swell, the *crescendo* being longer than the *diminuendo*.



This is repeated, evening to evening, without variation; but after long waiting and many disappointments comes a change that is at once a surprise and a delight: —



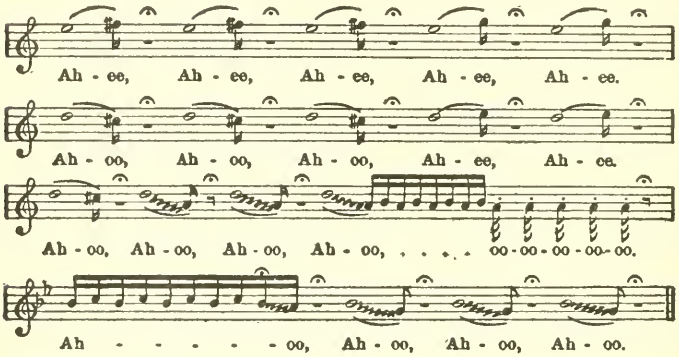
This owl ascends the scale generally not more than one or two degrees; the charm lies in his manner of descent, sometimes by a third, again by a fourth, and still again by a sixth. At the outset one is inclined to decide that the descent is according to the chromatic scale; then the steps will seem too short, sounding not more than half so long as those of this scale. I can best describe it as a sliding *tremolo,* — a trickling down, like water over pebbles: —



So rapidly and neatly is it done that an expert violinist could not easily reproduce it. Perhaps the descent of the whinny of a horse comes the nearest to it of any succession of natural sounds.

One September morning something woke me at two o'clock. My head was soon out of the window, and

just in time to hear what I had waited for for more than a year. My little screech-owl had come to make amends for his tantalizing delays. I had heard the strains before but had not secured them. They were as follows: —



It is hard to believe that pleadings so gentle can accompany thoughts intent on plunder and blood. I do not know where to look again for so painful a contradiction as exists between the tones of this bird and his wicked work. Wilson, noticing the inconsistency between his utterances and his actions, says of one he had in confinement, that at twilight he "flew about the room with the silence of thought, and perching, moaned out his melancholy notes with many lively gesticulations not at all in accordance with the pitiful tone of his ditty, which reminded one of a half-frozen puppy."

The naturalist is glad to be a "companion of owls" for a season, willingly taking the risk of their making night hideous and keeping him awake with their "snoring."

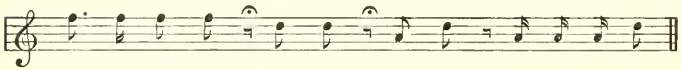
Owls have been hooted at perhaps as long as they have been hooting. "As stupid as an owl," "tough as a b'iled owl," — these expressions of reproach are still in vogue. But let us give the owl his due. An intelligent and apparently honest man tells me that he once ate of an owl — fattened on chickens, by the way, filched from him with surpassing cunning — and found it as sweet and tender fowl as he had ever tasted. So it seems the owl is not always stupid nor always tough. Few birds are clad in finer raiment, and no other inhabitants of the air fly with so velvet-like, so silent wings.

HEN MUSIC.

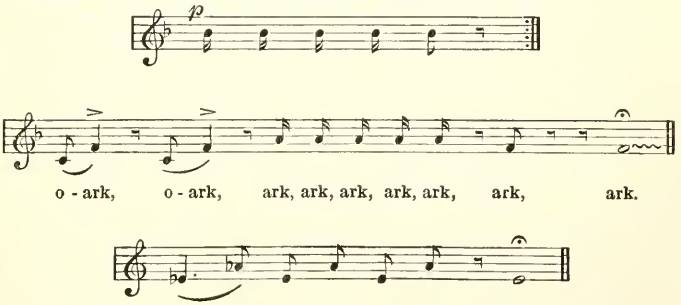
LATE one night, as I chanced near the hennery with a light, I was rewarded by an exquisite exhibition of the communicative ability of our domestic fowls. The hens moved on their perches, when the rooster spoke, rousing them still more. Stepping back, I soon heard a little sound, high and "exceeding fine," with a deceiving ventriloquous quality. Long spun, and then bent down in a graceful descent of the interval of a sixth, it terminated in a more decided tone, a peculiar tremor something less than a trill, and died away in a beautiful diminish.

This model example in *pianissimo* practice and in the art of holding the breath proved to come from one of the hens; and though the exact tones are here represented, no idea can be conveyed of the unique, perfect performance. The quieting effect on the family was instantaneous; not another move or peep. The descent noted is similar to that made by the screech-owl. The intervals are identical; but the hen slides down with an oily smoothness, while the owl, as elsewhere shown, comes trembling, shivering down.

Being an hour late with their breakfast one morning, I was received by the feathered supplicants with unusual demonstrations. They crowded about me so closely I could hardly step without treading on their toes. With heads lifted much higher than one would think they could be, and eyes shining, their tones and inflections were exceedingly human. Like all birds, wild or tame, hens employ, ascending and descending, the intervals of our scale, except in cases as above described; they use the half-step and whole-step, the major and minor thirds, the fourth, fifth, and sixth, with a good sprinkling of chromatics. In this instance every degree of the staff was brought into requisition, the slide of a fourth upward occuring oftenest.

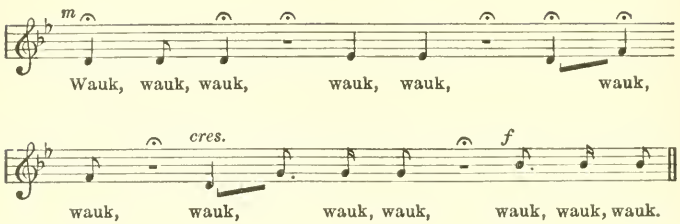


The notes of one hen were all the same, and *piano*.



But the rooster's petition "led all the rest." Striding about in the rear, an occasional brief command attesting

his title of "Captain," at length he burst out into this sonorous strain: —



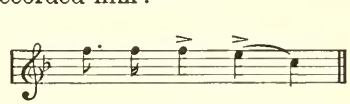
The Captain's voice was sound and powerful, and his intonation perfect. The slides of a third and fourth were carried up with a noble *crescendo;* and when he rose to the tonic at the close, the effect was thrilling as that of a clarion blast.

What with his sturdy song and dignified, soldierly bearing, the Captain's effort was full of hints, in manner and motive, for the composer, the singer, and the orator. When, a few mornings after his notable improvisation, I found the Captain's lifeless body, I was not surprised at the gentle demeanor of his many widows; they felt, perhaps more keenly than I, that one of the mighty had fallen.

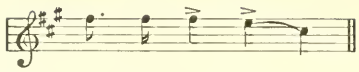
It was several weeks before I found a substitute for the Captain; at length a boy brought him, and I saw at a glance that he was the "General." With a word or two by way of greeting, he paused and stood erect before the bereft hens. Soon a pullet, the only shy member of the company, ran to him and put her head close to his. If the General moved, Ruth-like, she moved. A mourner

of wider experience was no less interesting in behavior. For some moments she stood aloof in disgust; then, with more ruffle at her neck than was becoming, flew at the General with all fury. The astonished soldier returned several blows, then checking himself, held his head to the ground, covered with confusion. The fair insulter had no idea of quitting; she continued the onslaught, finally ending it with a series of smart picks square on the lordly comb. The General "grinned and bore it," and thus ended the ludicrous mistake, for a mistake it was, the General fancying for an instant that he was dealing with a foeman worthy of his spur. On discovering his blunder, he was glad to suffer the most crushing humiliation.

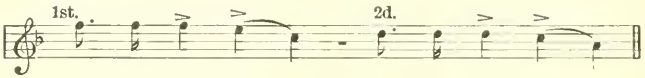
The newcomer proved a lusty crower; and after taking his morning call several times, and finding it without variation, I recorded him: —



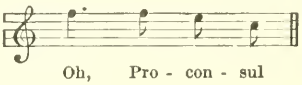
But one day, at a late hour, when he was at large, I heard him use very different intervals. Listening to the strange version over and over again, I was much surprised and perplexed; for, if I had erred in his case, which was a plain one, what might be my errors in intricate cases! I immediately changed the record to the new form, and wrote in the margin, "Every man is a genius in going wrong." But the next morning my ear caught the first form again. The second, the same to the eye but very unlike to the ear, was this: —



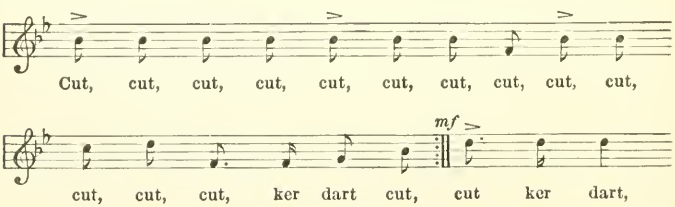
Had the second form been given in the key of the first, thus, —

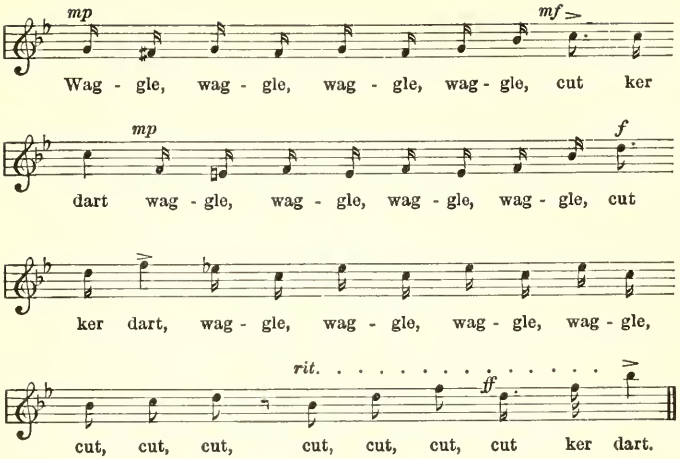


it would have seemed more natural; but as I was correct in both instances, I reasoned that the rooster might be. I finally settled it that the General's first form was his morning in-door salute, and that the second was his out-of-doors, "every-day" song; furthermore, that he or some of his ancestry had stolen his text from a strain in "The Seven Sleepers," which in my memory runs —



However, a waggish composer offset this theft when he caught the jubilant cackle of a hen as she broke from her nest, heart and throat full of joyous melody, snatched it bodily, I say, clapped it to paper, and made "Old Dan Tucker:" —




mp
mf
Wag - gle, wag - gle, wag - gle, wag - gle, cut ker
mp
f
dart wag - gle, wag - gle, wag - gle, wag - gle, cut
ker dart, wag - gle, wag - gle, wag - gle, wag - gle,
rit.
ff
cut, cut, cut, cut, cut, cut, cut ker dart.

APPENDIX.

APPENDIX.

SEVERAL spaces, some of which are indicated by the lines of periods, were left in the manuscript for enlargement and illustration. Unfortunately, but two of the musical illustrations can be found. The author was singularly ready and happy in such musical reports as those of the dropping water and the clothes-rack, giving them frequently, interspersing his conversation with bits of song.

Localities where the Songs were taken. (*See* p. 1.)

The observations here recorded were begun and continued for more than a year at Maple Grove, Dorset, Bennington County, Vermont. Afterward the work was carried forward in various parts of New Hampshire and in St. Lawrence County, New York, but principally in Southern Massachusetts, especially at and about Lynn and in Franklin, Norfolk County. — C., S. P.

Newness of the Field. (*See* p. 1.)

"I have had a feast for the past week with Wilson, Flagg, and Audubon. I have greater faith than ever in

NEWNESS OF THE FIELD. — *Contin.*

my undertaking. Poor Audubon! all through his big book he laments his inability to describe the songs of the charming birds. Flagg has given a few specimens. He thinks there can be no more of their songs copied.[1] Audubon was a wonder, but Wilson is, to my mind, the most charming of the writers on the birds. The two men were at work at the same time, and were well along with their great undertakings before they knew anything of each other. So it is; one can hardly have a new thought all to himself. If I had started this bird music twenty-five years back, I should have been all alone; I don't lack much of it now." — C., S. P., in a letter dated February, 1886.

Dr. Golz, formerly First President of the German General Ornithological Society (Allgemeine Deutsche

[1] There are those who think that none of the bird-songs can be copied: —

"As I have some musical knowledge, and have given some attention to the music of birds' songs, it may be worth while to add one or two remarks on a subject which is as difficult as it is pleasing. I need hardly say that birds do not sing in our musical scale. Attempts to represent their song by our notation, as is done, for example, in Mr. Harting's 'Birds of Middlesex,' are almost always misleading. Birds are guided in their song by no regular succession of intervals; in other words, they use no scale at all. Their music is of a totally different kind to ours." — **Fowler**, W. W.: A Year with the Birds, p. 257. London, 1889.

"Having been myself musical from my very cradle, and having made long and frequent observations of the songs of birds, I have come to the decided conclusion that the *natural* songs of *English* birds (the only birds with which *in a state of nature* I am acquainted) are never capable of musical notation, — are never, in fact, in tune with our musical scale. People may be startled by such an assertion, which is, in other words, that all birds sing out of tune." — R., M. H.: Songs of Birds. *Notes and Queries*, 3d ser. vol. xii., Aug. 3, 1867. (*See* Index; **Pole**, W.)

Ornithologen Gesellschaft), referring to the notations of Beckler (*see* Index, Beckler, D. H.), speaks with more reserve. In a note dated December, 1890, he supports, though somewhat indirectly, the opinion of our author; namely, that the main body of a bird-song may be fairly represented by the notes of our scale. He would except the performances of the gray nightingale and of our mocking-bird, as Mr. Cheney excepts the performance of the bobolink. Dr. Golz says: —

"A short time before the publication of Dr. Alfred Brehm's work 'Captive Birds' (Gefangene Vögel) a treatise by Beckler appeared in the 'Gartenlaube,' published by Keil at Leipsic. In this periodical that traveller and ornithologist attempted to reproduce or to express in notes of our musical scales the song of different birds, principally Indian birds, for instance the 'Shana' (*Cophychus macrurus*). I then pointed out that composers of high standing and opera-singers who themselves were bird-fanciers had endeavored in vain to render in notes of our musical scales the wonderful succession of tones of your mocking-bird (*Turdus polyglottus*). This would only be possible with very monotonous songs, — for instance, those of a finch (*Fringilla coelebs*) or a thrush (*Turdus musicus*), but not with the complicated strophes of our gray nightingale (*Luscinia philomela*), which vary from whole tones to halves and from thirds to fifths, — not to speak of those of your world-renowned mocking-bird. Among the latter there are, as a well-known fact, some monotonous and incompetent singers, which having been taken from their nests when very young, had been brought up without hearing the old birds sing. Unschooled singers, however, are for the most part virtuosi, master singers, and are not to be forced into notes of our system."

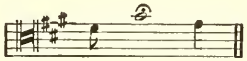
Newness of the Field. — *Contin.*

"Have received and carefully considered the magazine article (Henderson, W. J., Sportsman's Music, in the Century Magazine, xxxiv. 413–417). The author, claiming to be a 'musician,' asserts, to begin with, that 'there is nothing in Nature that resembles music;' that the succession of sustained sounds is not heard, — that 'the peculiarity of the songs of all birds is that they never sustain notes.' Then he quotes the Rev. Mr. Haweis to support him, and the reverend takes the cuckoo — the English cuckoo, I suppose — as the best example. Says he 'sings a *true* third, and sometimes a sharp third, or even a fourth,' and this is the 'nearest approach to music in Nature.' Of all the birds to select for the purpose, the cuckoo of any country would seem to be the very last. I know nothing about the English cuckoo, but our cuckoo never sings a third, 'true' or false, nor a 'fourth.' His song is a perfect monotone excepting an occasional drop of a half-step. That is the whole of it. The writer of this article has a 'profound sense' of the impossibility of doing justice to the quail's song. Old Hundred is not plainer than the notes of the quail, and no idea is given, in either of the two examples, of the notes of the quail. The same is true of all that is said of the meadow lark." — C., S. P., in a letter dated July, 1887.

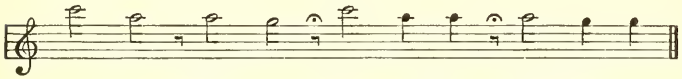
For newness of the field, *contin.*, *see* Index, **Newness**, etc.
For intervals of English cuckoo's song, *see* Index, **Cuckoo.**

Music in Nature. (*See* p. 2.)

With this same article for his text, the author writes again at length: "Do the birds 'never sustain notes'? Listen to the loon, our largest bird, calling to her young in time of peril with a loud, long tone so startlingly like the human voice: —

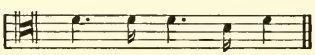


Here is a 'fourth and a true third.' Descend, now, and listen to one of the smallest of our singing-birds, the titmouse: —



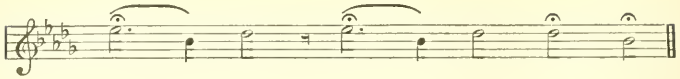
The chickadees sustain these notes longer than we do the half and quarter notes in Dundee or Old Hundred. Here is a 'true third' and a true second; and they are sung with a purity of tone not to be equalled this side of heaven. The little black-throated green warbler sings with marked distinction and moderation, —

Here is the true major third, and the strain is identical in melody with 'Larboard Watch Ahoy': —

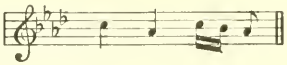


MUSIC IN NATURE. — *Contin.*

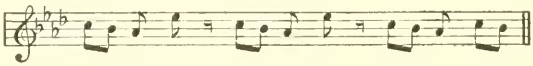
The wood-pewee sings long and well-sustained tones: —



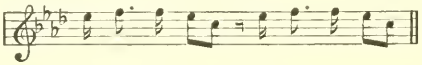
The song of the meadow lark is very choice in point of melody, often beginning with —



and soon adding —

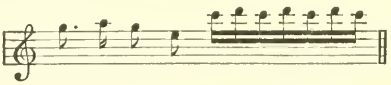


and, further on, —

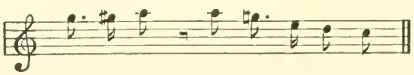


Nor is this all the beautiful melody of the meadow lark.

"A few mornings since I heard a chewink singing the first strain of 'Rock of Ages,' cutting it a little short with a trill: —

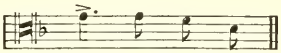


I have remembered for forty years the song of an oriole, illustrating the old form of the minor scale, — the seventh sharp ascending, natural descending: —



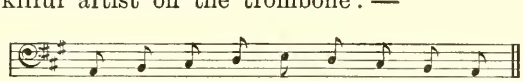
MUSIC IN NATURE. — *Contin.*

The thrushes and the sparrows, our greatest songsters, — I will not ask them to help me in my reply. I have heard a cock crow an exclamatory phrase in the oratorio of the 'Seven Sleepers': —

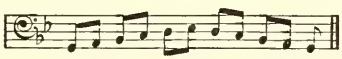


And where did we get 'Old Dan Tucker'? From the hen as she quits the nest, singing her inherited song of rejoicing.[1]

"But I do not need the birds; the four-footed kind can render answer. One winter morning, when everything was 'frozen solid,' our old Morgan mare, Fanny, saluted me with a clear scale-exercise, worthy in performance of a skilful artist on the trombone: —



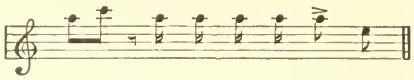
The next morning the weather had changed; it was thawing, all was soft and sloppy. Not a note from Fanny till I had walked the length of the barn and come in full sight of her. Then in a subdued voice she called, —



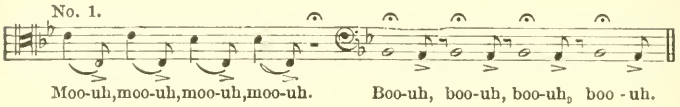
A yearling colt, spying a strange horse at the hitching-post, sent him this challenge: —

[1] *See* Index, **Hen Music.**

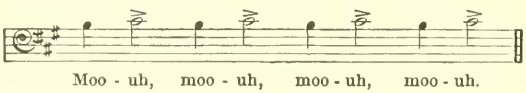
MUSIC IN NATURE. — *Contin.*



Two young bulls once gave me a musical entertainment: —



Number two reversed the order. This was while, with nose to the ground, he was pawing, throwing dirt over his back and playing the dare-devil generally. Enough of this, and he thrust up his nose and trumpeted, —



It was interesting to learn that there was no departure from the key in the long interval of a tenth, — an octave and a third. The forceful tone on C sharp was in tune."

For music in Nature, *continued, see* Index, **Music in Nature.**

Newness of the Field. (*See* p. 1.)

"Those pages of bird talk you sent me are read at last. They have some good points.

. . . . . .

NEWNESS OF THE FIELD. — *Contin.*

"I have seen no bird music that is not strained and unnatural; but I must say nothing 'out loud.' I am familiar with the songs of these birds, and find nothing here that I have heard. Now then, tell me who the author is and when he wrote." — Letter from S. P. C. in response to an article extracted from an American Magazine of 1858, and sent him by the editor of the present volume. Date, November, 1889.

Our author, unfamiliar as he was with the literature of bird music, regarded himself as standing pretty much alone; the field was to him decidedly new. Would he have felt differently had he made an extended survey of it? W. J. Broderip published the third edition of his "Zoölogical Recreations" in 1857, giving in one of the earlier chapters the pith of the famous paper by Daines Barrington, published in the Philosophical Transactions of 1773. He says: —

"The Hon. Daines Barrington, who paid much attention to this subject, remarks that some passages of the song in a few kinds of birds correspond with the intervals of our musical scale; but that much the greater part of such a song is not capable of musical notation. He attributes this to the following causes: first, because the rapidity is often so great, and it is also so uncertain where they may stop, that it is impossible to reduce the passages to form a musical bar in any time whatsoever; secondly, on account of the pitch of most birds being considerably higher than the most shrill notes of instruments of the greatest compass; and lastly, because the intervals used by birds are commonly so minute that we cannot judge at all of them from the more gross intervals into which our musical octave is divided.

. . . . . .

Newness of the Field. — *Contin.*

"Barrington defines a bird's song to be a succession of three or more different notes, which are continued without interruption during the same interval with a musical bar of four crotchets in an *adagio* movement, or whilst a pendulum swings four seconds. Now let us see what notes have been detected in the song. Observers have marked F natural in woodlarks; A in thrushes; C falling to A commonly in the cuckoo; A natural in common cocks; B flat in a very large cock; D in some owls; B flat in others. Thus we have A, B flat, C, D, and F, to which Barrington adds G, from his own observations on a nightingale which lived three years in a cage; and he confirms the remarks of the observer who furnished him with the list, and says he has frequently heard from the same bird C and F. To prove the precision of the pitch of these notes, the B flat of the spinnet by which he tried them was perfectly in tune with the great bell of St. Paul's. E, then, is the only note wanting to complete the scale; but, as he says, the six other notes afford sufficient data for making some conjectures with regard to the key in which birds may be supposed to sing, as these intervals can only be found in the key of F with a sharp third, or that of G with a flat third; and he supposed it to be the plaintive flat third, that affecting tone which, in the simple ballad, or 'wild and sad' chorus, so comes home to our bosoms. . . . Barrington pronounces in favor of the flat third because he agrees with Lucretius that man first learned musical notes from birds, and because the cuckoo, whose 'plain song' has been most attended to, performs it in a flat third."

This brings us down to 1857 in England, — indeed, we may say on the European continent, — and if we are to trust a philosopher thoroughly versed in the structure of music, no advance was made, to say the least, in the next thirty years. "No one who has taken the very

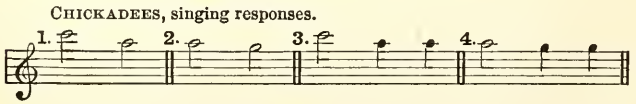
NEWNESS OF THE FIELD. — *Contin.*

first steps in the philosophical study of the structure of music could entertain the idea that the sounds naturally emitted by birds . . . were entitled to be called either music or melody." So writes Wm. Pole in "Nature" for August 11, 1887. While it is the intent of the editor to collate simply, not to criticise, he is moved to inquire if the notations grouped below, besides showing the extension of the field as surveyed in England in the last quarter of the 17th century and as practically left one hundred years later, do not constitute a sufficient answer to the author of "A Year with the Birds," M. H. R., to the writer on "Sportsman's Music," to the author of "Music and Morals," and to the distinguished contributor to "Nature" for August 11, 1887. The writer last mentioned says: —

"We arrive, therefore, at the conclusion that the essential feature of music, its minimum component, must be a combination of sounds of different pitches, these pitches being moreover strictly fixed and defined, and their relations to each other corresponding to certain series agreed on and adopted as standard musical scales. Such combination will of itself constitute music; we may add all sorts of other features, but without the above essential foundation we cannot have music, in an artistic point of view."

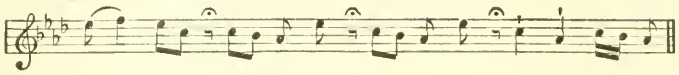
What "component" of the "essential foundation" is lacking in this group of melodies?

CHICKADEES, singing responses.

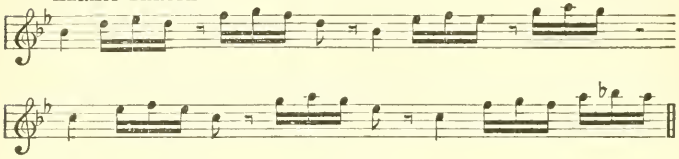


NEWNESS OF THE FIELD. — *Contin.*

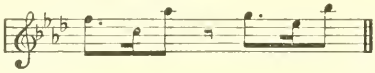
MEADOW LARK.



HERMIT THRUSH.



WOOD THRUSH.



See Index, **Sully, J.**

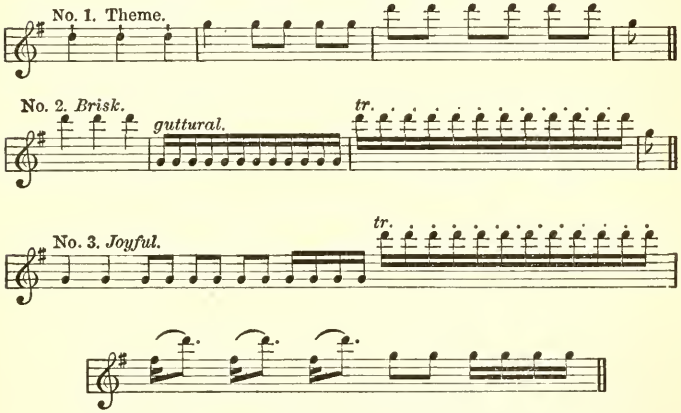
"I have corrected the proof-sheets of Bluebird and Robin, and they *look* much more interesting than I thought they would. When I compare my work with any that I have seen, I confess to you privately that I cannot help feeling a little proud. It was quite exciting to see my thoughts up in secluded Dorset in print, — these and the notes of birds that have been so long neglected. It gave me a new feeling; I had actually done something. Why, sir, it is astonishing to read the childish writing about the music of the birds. And the one man who has done the most in the way of putting bird music on paper is often wide of the mark." — C., S. P., in a letter dated May, 1889.

The reference here is to the author of "Birds and Seasons of New England," now published under title, "A Year with the Birds."

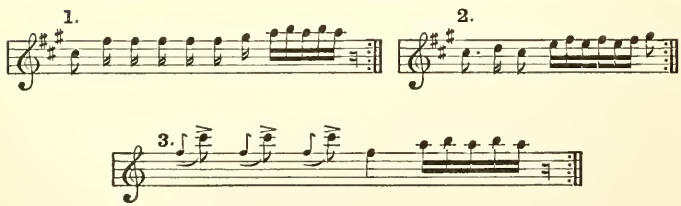
NEWNESS OF THE FIELD. — *Contin.*

While the old singing-master always spoke admiringly of Mr. Flagg, in his estimation the musician fell far short of the naturalist and the man. When we compare the reports of the two of the song-sparrow's music it is not surprising that he could not concur with him when he wrote of his seven illustrations, "All the variations of his song are given below."

SONG SPARROW. — **Flagg** : A Year with the Birds, p. 15.



SONG-SPARROW. — Cheney. (*See* Index, **Song-Sparrow.**)



Music in Nature. (*See* p. 2.)

Vesper-Mice.

Buckland, F: Log-book of a Fisherman and Zoölogist (London, 1875), pp. 103, 104. Mr. Buckland says, "The song is a genuine song, as good and as musical as that of a lark on a fine summer morning."

Davis, W. T., *in* Amer. Nat., vol. xxiii., 1889, pp. 481–484. — **Edwards,** W. H., *in* Amer. Nat., vol. iii., 1870, p. 551. — **Lockwood,** *Rev.* S.: A singing hesperomys. (*Amer. Nat.*, vol. v., 1871, p. 761.) — **Nature,** vol. xvi., 1877, p. 558; vol. xvii., 1877, pp. 11, 29.

Nor is music confined to the shore.

Eel and Fish.

See **Abbott,** *Dr.* C. C.: Waste-land Wanderings, pp. 300–302. — **Edinburgh Philos. Journ.,** vol. xiv. p. 188. — **Musical Fishes.** (*Pop. Sci. Mo.*, vol. xxiii., Aug., 1883, p. 571.) — **Peal,** S. E.: Voice in Fish. (*Nature*, vol. xxi., Nov., 1879, p. 55). — **Tennent,** *Sir* J. E.: Sketches of Nat. Hist. of Ceylon (London, 1861), pp. 380–385. — **White,** *Rev.* G.: Nat. Hist. Selborne, ed. by E. Jesse (London, 1878), p. 245, *note.* — **Yarrell,** W.: Hist. of Brit. Fishes, vol. i., pp. 44, 107.

"A party lately crossing from the promontory in Salsette called the 'Neat's Tongue,' to near Sewree, were about sunset struck by hearing long, distinct sounds like the protracted booming of a distant bell, the dying cadence of an Æolian harp, the note of a pitch-pipe or pitch-fork, or any other long-drawn-out musical note. It was at first supposed to be music from Parell floating at intervals on the breeze; then it was perceived to come from all directions almost in equal strength, and to arise from the surface of the water all round the vessel. The boatmen at once intimated that the sounds were produced by fish abounding in the muddy creeks and shoals around Bombay and Salsette; they were perfectly well known, and very often heard. Accordingly, on inclining the ear towards the surface of the water; or, better still, by placing it close to the planks of the vessel, the notes appeared loud and distinct, and followed each other in constant succession. The boatman next day produced specimens of the fish, — a creature closely resembling in size and shape the fresh-water perch of the north of Europe, — and spoke of them as plentiful and perfectly well known." — **Dr. Buist,** *in* **Bombay Times, January, 1847.**

MUSIC IN NATURE. — *Contin.*

A record of "musical sounds like the prolonged notes on the harp," proceeding from under water, is to be found in "Bombay Times," Feb. 13, 1849.

FROG.

Wheelwright, H. W. (Ten Years in Sweden, London, 1865), mentions a little frog (*Bombinator igneus*) which has a love-tune like the ringing of bells.

"'New Views in Natural History, leading up to the Perfectly Authentic History of an Interesting but Unfortunate Frog,' is the queer title of a pamphlet recently published in a French country town by a good abbé. It tells a simple and touching story of a melodious frog. The abbé relates how he called one day upon a sick man, one of the poorest of his parishioners, who, in honor of the priest's visit, threw into the fireplace a few branches, which blazed up into a bright flame.

"Presently there appeared, from under an old worm-eaten chest, which was the sole article of furniture in the room, an enormous frog, which hopped along toward the blaze. The frog seemed to be at home, and so he was. He was the sick man's only friend.

"The abbé regarded the animal with interest. Thereupon the peasant, in order to repay the priest for his attention to his pet, gave an exhibition of the frog's accomplishments. In a nasal voice, the peasant began singing one of the old French ballads that have come down from the time of King Dagobert — one of the simplest of songs, both in words and music. 'What was my astonishment,' writes the abbé, 'to hear the frog, after the man had sung one couplet of his song, take up the note upon which the man had ended, and to utter his *la*, drop to *fa*, go up to *la* again, and then down to *mi*, with a precision worthy of a choir-master. And these notes, *la*, *fa*, *la*, *mi*, the frog repeated regularly and correctly, in a tone guttural and sweet, after every couplet that the man sang, like a sort of chorus. The notes were plaintive and a little veiled, with a touch of melancholy and regret, and sounded much like an old-fashioned harmonica.'

"The abbé describes also the expressive pantomime that the frog went through as he sang his notes. He looked tenderly toward his master, with an expression as if he really desired to please, and felt also a wish to have his performance appreciated.

"This was, unfortunately, the only performance by the frog that the abbé witnessed. The poor man died a few days afterward, and the singing frog disappeared. No one knows what became of him." — *Newspaper clipping.*

MUSIC IN NATURE. — *Contin.*

CRICKET.

A cricket (*Chlorocoelus Tanana*) is caged, like a bird, for its song. — **Bates,** H. W.: The Naturalist on the River Amazons, pp. 132–134.

German youths are so fond of cricket music that they "carry their boxes of crickets into their bedrooms at night, and are soothed to sleep with their chirping lullaby." — **Jaeger,** B.: Life of North Amer. Insects, p. 114.

And did not a similar custom prevail in ancient Greece?

"In the common field-cricket of Europe the male has been observed to place itself, in the evening, at the entrance of its burrow, and stridulate until a female approaches, when the louder notes are succeeded by a more subdued tone, whilst the successful musician caresses with his antennæ the mate he has won. Any one who will take the trouble may observe a similar proceeding in the common house-cricket. The nature and object of this insect music are more uniform than the structure and situation of the instrument by which it is produced." — **Bates,** H. W.: The Naturalist on the River Amazons, p. 133.

ANT.

See **Forbes,** H. O.: Sound-producing Ants. (*Nature*, vol. xxiv., 1881, pp. 101–102.) — **Peal,** S. E.: Sounds made by Ants. (*Nature*, vol. xxii., 1880, p. 583; vol. xxiv., 1881, p. 485.)

For other of Nature's musicians, *see* **Baird,** S. F., *in* Ann. Record of Science, 1877, pp. 282, 309. — **Francheschini,** R.: Musical Insects, 5 pp. (*Pop. Sci. Mo.*, vol. xxxix., Sept., 1891.) — **Gardiner,** W.: Music of Nature, chap. 14. — **Hinrichs,** *Miss* A.: Summer's Natural Orchestra, 2 pp. (*Pop. Sci. News*, vol. xxv., Sept., 1891.) — **Landois,** H., *in* Das Ausland, vol. xliii., 1870, pp. 429, 430. — Die **musikalischen Insecten** und ihre Instrumente. (*Gartenlaube*, 1872, pp. 698, 699.) — **Schele de Vere,** M. R. B.: Music in Nature. (*Putnam's Mag.*, N. S. vol. vi., 1870, pp. 173–182.) — Unknown tongues, *in his* Stray leaves from the Book of Nature, p. 241, N. Y., 1856. — **Scudder,** S. H., *in* Am. Naturalist, vol. ii., 1868, p. 113. — **Sterne,** Carus: Das erste Ständchen. (*Gartenlaube*, 1875, pp. 787–789.) — **Wilson,** *Dr.* A.: Songs without words. (*Eclec. Mag.*, N. S. vol. xxxvi., 1882, pp. 737–745.)

For Stridulating Crustaceans *see* Nature, vol. xviii., 1878, pp. 53, 95.

MUSIC IN NATURE. — *Contin.*

Any expression of doubt as to the existence of music in Nature was sure to be promptly met by our author. On one occasion he burst out, "That sort of talk should come only from the fellows that find their cuckoo music in the top of a Dutch clock. The trombone blasts of the peacock are in melodic steps, the horse uses both the diatonic and the chromatic scale, and the ass jerks out his frightful salute in perfect octaves.[1] *All things* have music in the rough, from the insect with a fiddle on its back[2] up to behemoth."

Carlyle says that the heart of Nature is music, and Niagara,[3] Mammoth Cave,[4] the sonorous sands and musical stones seem to bear him out. Illustrations of music in Nature are to be found in a paper "On Melody in Speech"[5] by Dr. F. Weber (an English organist):

[1] The vocal skill of the horse and of the ass are united, it seems, in a four-footed singer from afar. "An ape, one of the Gibbons, produces an exact octave of musical sounds, ascending and descending the scale by half-tones; so that this monkey 'alone of brute mammals may be said to sing.'" — **Darwin.**

[2] This expression suggested the design on the cover of the present volume. Reverse it, and we have a fair description of what old Father Kircher found on an antique gem and transferred to the title-page of the *Musurgia*. The old music-loving monk being the first, so far as we know, to write down the bird songs, it has seemed proper to link to him, by this pretty badge, the last lover of music and Nature to busy himself in the same delightful sort of reporting. The broken harp and the singing insect may well be perpetuated as the emblem of the guild.

[3] Niagara. *See* Thayer, E. M.: Music of Niagara. (*Scribner's Mag.*, vol. xxi., 1880, pp. 583–586.)

[4] Mammoth Cave, Music in the, *in* Litt. Liv. Age, vol. lxviii., 1861, p. 289.

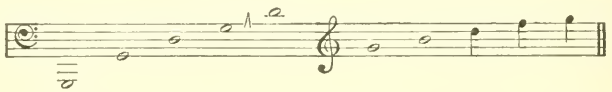
[5] Music in Speech, *in* Philos. Trans., vol. ii., p. 441. Same article in *Litt. Liv. Age*, vol. l., 1856, p. 228.

Music in Nature. — *Contin.*

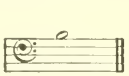
"Longman's Magazine," vol. ix., 1877, pp. 399-411. (*See* Index, **Weber,** F.) A reply by Wm. Pole is to be found in "Nature," vol. xxxvi. pp. 343-345.

See Index, **Fowler,** W. W. — **Pole,** Wm. — **R.,** M. H. — **Weber,** *Dr.* F.

Dr. Weber, referring to his article in a letter to the editor, dated Jan. 5, 1891, says: "It is said that an American organist claims to have discovered the principal tone and its harmonics which the waters of Niagara are continually singing, to be four octaves below the following:



By the law of harmonics there ought to be another tone, B, —



which the organist must have overlooked. These tones are the natural tones of the French horn and the trombone, and may be easily produced as harmonics on the long Violoncello or Double Bass strings."

Structure of Melody.

Human Music and Animal Music. (*See* p. 2.)

"It has been found by Helmholtz that the most natural successions follow the order of the harmonics or upper-tones, which, as we have observed, enter into rich notes or clangs. That is to say, the most natural sequence is such as passes from the fundamental to one of the prominent

STRUCTURE OF MELODY. Human and Animal Music. — *Contin.*

upper-tones, — for example, to the octave above; the next natural, such as passes to a second note which possesses an upper-tone in common with the first, — *e. g.*, to the fifth above. In such cases, according to Helmholtz, the ear is gratified by a vague sense of similarity in diversity, since the second note, in spite of its difference, retains an element of the first note. Over and above this, the ear appears to derive pleasure from a succession of notes which are near one another in the scale; that is to say, which form a small interval as to pitch. By means of such steps (our smallest modern interval is a semitone) we are able to measure the several upward and downward movements of a melody.

"Finally, it is to be observed that one essential of melody, according to our modern notions, is the presence of some ruling tone or key-note, which serves as a starting-point and a resting-place for the melody, and in reference to which the position of all the successive notes of the tune is estimated.

"If now we take a careful survey of animal music we shall find that all these elements of human melody are to some extent represented. Thus we shall see that it makes use of discrete notes of definite pitch, of a wide variety of timbre, of time relations or rhythm, of melodic affinities, and even in a measure of tonality or key. This statement may, no doubt, appear an exaggeration to those of our readers who have never examined and analyzed the music of the woods which has so often delighted their ears. We can only ask them to defer forming an opinion till they have the facts before them.

. . . . . .

"It cannot be said that birds have a very good ear for time. In many songs there is hardly anything deserving of the name of rhythm, so capricious and irregular are the sequences. And even in the case of the higher and more elaborate songs it is difficult to reduce the succession of notes to a time-order like that of our bar-system. Perhaps we ought not to be surprised at this, seeing that the pleasure of time involves complex intellectual actions. Nevertheless, there is clearly an adumbration of the simpler forms of rhythm in bird-song. Thus it is not uncommon to meet with notes which are held twice and three times as long as others, and so on, — a fact which clearly implies the existence of a nascent sense of duration and power of comparison.

"With respect to the melodic relations of notes, bird-song shows a considerable degree of true artistic insight. We find each principle, that of continuous steps and that of harmonic intervals, clearly illustrated.

. . . . . .

STRUCTURE OF MELODY. Human and Animal Music. — *Contin.*

"The harmonic affinities of notes are clearly perceived and selected by most singing-birds. Thus among the commonest intervals are the fifth and fourth, both of which are marked by the presence of a common partial tone. The octave, though a more closely related interval than either of these, appears less frequently than they do. The twelfth, too, which stands almost on a level with the octave in point of harmonic affinity, is to be met with occasionally.

"As to key, or tonality, birds may be said to recognize and embody this element of human melody, in so far as their song naturally falls in a certain key, and is always executed in one and the same key. On the other hand, these feathered musicians seem to have little or no notion of setting out from and returning to one particular note. They are wont to break off in the most capricious way at any point in their melody without the least sense of incongruity. Thus it cannot be said that birds show any clear appreciation of tonality. And this is not to be wondered at, seeing that such a perception presupposes considerable intellectual power, and that even in the case of human music the principle of tonality only becomes prominent when the art has reached a certain stage of development." — **Sully, James**: Animal Music. (*Cornhill Mag.*, vol. xl., Nov., 1879, p. 605.)

"And yet is n't it strange that bird music is *not* tiresome? My memory recalls for me parts of California where the meadow lark's 'silver whistle' (our Eastern fellow gives no idea of it) is almost the only bird-song heard the year round; and yet, though *it* is heard superabundantly, 't is never a whit less fresh and charming than at first. All this gives me a feeling that there is something more than a difference of degree between human and bird music. What is the difference? To my thought, bird melody resembles the Swiss mountaineer's yodle on his horn, which one hears the year round with delight, while if he played the 'Star-Spangled Banner' nightly we would begin cursing him at the end of a month. 'T is indefinite, unspecialized music, not narrowed to the expression of a specific sentiment. Probably you will remind me that there is a deeper problem yet: what do the birds themselves think of it? What does Mrs. Robin think when at summer's end she finds Mr. Robin singing the same song as at summer's beginning, or nearly the same? Can you find some open-minded robin down in Franklin, ere long, and let me know the truth of it, according to his view?" — **Clark**, Xenos, in a letter to the author, dated Sept. 7, 1888, Monterey, Berkshire County, Mass.

"To vocal and instrumental music he preferred that of birds; not from being incapable of finding delight in the others also, but because human music leaves in the mind a continual agitation which disturbs both atten-

STRUCTURE OF MELODY. Human and Animal Music. — *Contin.*

tion and sleep, . . . whereas no such effect can be left from the modulation of birds, because those modulations, not being equally imitable by us, cannot affect our internal faculties in the same degree." — **Gassendi**, P., *in* Vita Peireskii.

Harmonic Affinities in Bird Music. (*See* p. 6.)

For an interesting article on harmonic affinities as perceived and selected by the birds, the reader is referred to the late Mr. Xenos Clark's "Animal Music, its Nature and Origin" (*American Naturalist*, vol. xiii., April, 1879, pp. 209–223.)

"The perfect fifths, fourths, thirds, and octaves," he writes, "have a marked predominance, their proportion of the whole number being respectively twenty-seven per cent, twenty-five per cent, twenty-six per cent, and nine per cent, or taken all four together, eighty-seven per cent, as against thirteen per cent of the remaining five intervals."

Of course the notations on which such calculations are based must be correct or nothing is proven. A like calculation based on an equal number of the author's notations, selected from the songs of the choicer vocalists, would bring the percentage perhaps still higher.

Dr. Weber, the organist, before quoted, says, "The intervals we observe most in the voices of animals are fifths, octaves, and thirds, and also fourths and sixths."

"The cases of the starling, the piping bullfinch, and the mocking-bird, which can be taught to whistle a tune, show the same power still more highly developed. These instances prove not merely susceptibility to musical sounds, but also a capacity for distinguishing the harmonic intervals. It is stated that some birds, even in the wild state, display considerable

HARMONIC AFFINITIES IN BIRD MUSIC. — *Contin.*

knowledge of the musical scale; and a San Francisco naturalist[1] is at present engaged upon a work in which he hopes to show that the human ear posesses in this respect merely a more highly developed form of the common vertebrate sensibility. When we reflect upon the purely physical and physiological basis, which, as Helmholtz has taught us, underlies the musical intervals and the distinctions of harmony and discord, there is certainly no reason why they should not be perceived by all the higher animals alike, in a greater or less degree." — **Allen**, G.: Æsthetic Feeling in Birds. (*Pop. Sci. Mo.*, vol. xvii., September, 1880, pp. 653-654.)

Genesis of Bird Song. (*See* p. 5.)

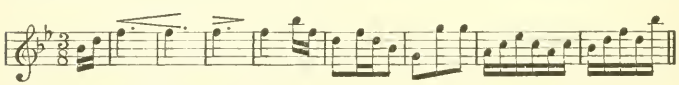
"From all we can gather it appears most probable that in its present form our song-bird proper — our bird with a song to sing — is not much older than man; that he found his song just in time to gladden the ears of God's last and greatest creation; that he struggled through countless ages and awful changes in order to fit himself for our entertainment.[2] Think

[1] Probably Mr. Xenos Clark, who was at one time on the Pacific Coast.

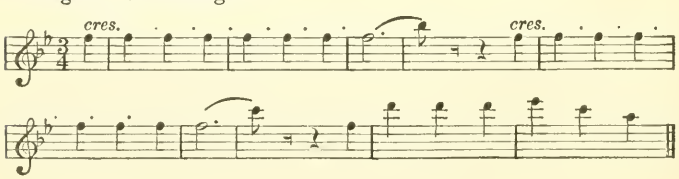
[2] The Rev. Charles Kingsley credits the birds with instruction as well as entertainment. In his opinion they set the key-note for the songs of the old poets; the mediæval bards borrowed liberally from the birds (A Charm of Birds, *Fraser's Mag.*, vol. lxxv., June, 1867, p. 802).

Both Gardiner and Kingsley were anticipated, however, by a nameless magaziner: —

"We have alluded to the rapid passages in the song of birds, the succession of soft and loud sounds, the contrast between quick and slow notes. Is it quite improbable that these, and perhaps other peculiarities in their melodic exertions, may have furnished hints for imitation? or must we produce vouchers of crotchets and quavers? Let the following bars of a favorite waltz, of German composition, be played on the flageolet: —



And again the following: —



GENESIS OF BIRD SONG. — *Contin.*

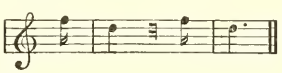
what the avian race has endured since first Archæopteryx felt the feathers begin to bud in his arms! What a long, slow, hesitating, faltering current of development, from a scaly amphibian of the paleozoic time, up, up, to the glorious state of the nightingale and the mocking-bird![1]

These specimens, if imagination carry us not too far, seem to us direct imitations of some wilder melodies of birds, probably of the nightingale; and we could produce others of a similar nature, to us equally striking.

"But we beg the cuckoo's pardon; we had almost left him out of the catalogue of professors. The cuckoo, we are convinced, has furnished an important hint to the human race.

. . . . . .

"The cuckoo has but two notes at his command; these notes are always the same, and strictly appreciable; and their interval is invariably that of the minor third, sung downwards: —



"Here again, the Big-wigs of harmony have written volumes in search of the origin and foundation of the minor scale, when they might have found it in every copse. How the great Tartini, and a dozen others, have tugged at the problem! Perhaps they were family-men. The minor third is all that is necessary for the formation of the minor scale; the other intervals we make free with from the major." — **New Mo. Mag.**, vol. vii., 1823, p. 303.

"Birds were assuredly the most ancient music-masters. And even to this day, with all our boasted refinement, all our natural and artificial exertions, who will be bold enough to assert that either Mrs. Billington, the delight of the present age, or Farinelli, the admiration of the last, ever approached the excellence of these instinctive musicians, either in fertility of imagination, in the brilliancy of their shake, or in neatness of execution?" — **Burgh, A.**: Anecdotes of Music, etc. (London, 1814), vol. I. p. 13, note.

But, like all the good thonghts, this thought is very old. The anticipating magaziner was in turn anticipated: —

> "At liquidas avium voces imitarier ore
> Ante fuit multò, quam laevia carmina cantu
> Concelebrare homines possent, aureisque juvare."
>
> **Lucretius**, lib. v. line 1378.

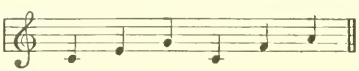
See **Gardiner, W.**: Music of Nature, chapter xii.

[1] *See* **Allen, G.**: Ancestry of Birds (*Longman's Mag.*, vol. iii., January, 1884, pp. 284–298); *also* **Rhoads, S. N.**, *in* **Am. Nat.**, vol. xxiii.,

GENESIS OF BIRD SONG. — *Contin.*

1889, pp. 91–102. I never see a brown thrush flashing his brilliant song from the highest spray of a tree without letting a thought go back over the way he has come to us, and I always feel that to protect and defend the song-bird is one of man's clearest duties." — **Thompson,** M.: Sylvan Secrets, p. 97.

"The growth of Melody has been clear and natural enough. Nature itself laid the foundation when Sound first broke out in its thousand shades and colorings, from the grateful hum of bees to the terrific roar of monster ocean. It is this world of sound — Nature's great diapason — which we draw upon when molding into shape the nursery lullaby, or the operatic *scena* which commands the admiration of patrician and plebeian alike. To sound monophonic tones is possible to both man and beast, and the first cravings of primitive man were towards an imitation of the sounds of life around him. In this way the Kamtschatkales have this succession of tones: —



not from any musical system, but by imitating the cry of the wild duck. The notes constitute the open or arpeggio form of our chords $\frac{5}{3}$, $\frac{6}{4}$. The moanings of man and beast doubtless led to the first funeral chants, such as the Egyptian Maneros, called by the Greeks *Linos* (*Λίνος*), and reputed the oldest music in the world." — **Crowest,** F. J.: Musical Groundwork, pp. 88–89.

SINGING AND DANCING.

And if man has profited by the example of the birds in the art of song, how about the sister art of dancing?

"The white-banded mocking-bird of southern South America — perhaps the finest feathered melodist in the world — is one of those species that accompany music with appropriate motions. And just as its song is, so to speak, inspired and an improvisation unlike any song the bird has ever uttered, so its motions all have the same character of spontaneity, and follow no order, and yet have a grace and passion and a perfect harmony with the music unparalleled among birds possessing a similar habit. While singing he passes from bush to bush, sometimes delaying a few moments on and at others just touching the summits, and at times sinking

GENESIS OF BIRD SONG. — *Contin.*

out of sight in the foliage; then, in an access of rapture, soaring vertically to a height of a hundred feet, with measured wing-beats, like those of a heron; or mounting suddenly in a wild, hurried zigzag, then slowly circling downward, to sit at last with tail outspread fanwise, and vans glistening white in the sunshine, expanded and vibrating, or waved languidly up and down with a motion like that of some broad-winged butterfly at rest on a flower." — **Hudson**, W. H.: Music and dancing in Nature. (*Longman's Mag.*, vol. xv., 1890, pp. 597-610.)

See **Darwin**, C.: The Descent of Man (N. Y., 1872), vol. ii. pp. 65-68. — **Fish**, E. E.: Dancing Gander. (*Pop. Sci. Mo.* vol. xxv., 1884, pp. 715-716.) — **Nutting**, C. C.: Chiroxiphea linearis, Bp. (U. S. Nat. Mus. *Proceedings*, vol. vi., 1883, pp. 384-385.) — **Some Western Birds** (cranes), *Putnam's Mo.*, vol. iv., 1854, p. 80. — **Wallace**, A. R.: (Birds of Paradise) The Malay Archipelago, pp. 466-467.

"Between these two opposing tendencies, one urging to variation, the other to permanence (for Nature herself is half radical, half conservative), the language of birds has grown from rude beginnings to its present beautiful diversity; and whoever lives a century of millenniums hence will listen to music such as we in this day can only dream of. Inappreciably but ceaselessly the work goes on.[1] Here and there is born a master-singer, a feathered genius,[2] and every generation makes its

[1] Such was the author's belief. His words are "The end is not yet."

[2] "Died, at the house of Colonel O'Kelly, in Half-moon Street, Piccadilly, his wonderful parrot, who had been in his family thirty years, having been purchased at Bristol out of a West India ship. It sang, with the greatest clearness and precision, Psalm CIV., 'The Banks of the Dee,' 'God save the King,' and other favorite songs; and, if it blundered in any one, instantly began again, till it had the tune complete. One hundred guineas had been refused for it in London." — **Gentleman's Mag.**, pt. 2, vol. lxxii., 1802, p. 967. (Another account, **Gentleman's Mag.**, pt. 2, vol. lvii., 1787, p. 1197.)

But long before the day of this genius, Rome could boast of a lark that, after singing divinely, would pronounce the names of the saints in most musical Italian, carrying his repertoire of sweet words up to fairly astonishing numbers. Father Kircher — who, by the way, has not a little valuable matter hid away in the hard shell of his old Latin — was overcome with wonder at the performance of this bird. He could hardly be persuaded that he was not listening to a human voice, and was convinced without further argument that all birds with melodious throats might not only sing the music, but speak the language, of men.

GENESIS OF BIRD SONG. — *Contin.*

own addition to the glorious inheritance." — **Torrey**, B.: Birds in the Bush, p. 47.

"Let us for a moment try to conceive how this process may have been accomplished. We presuppose a certain amount of the power of vocalization at different heights or pitches, the results of social needs, etc. We further assume, as the correlative of this, the existence of a nascent sensibility to differences of pitch, also a feeling of preference for certain kinds of timbre over others. The circumstances of wooing, with its eager rivalries, would serve to bring out the existing powers of vocalization to their fullest. The more striking and attractive the sounds produced by a particular male, the more likely would it be to win his mate. Now a voice might be more impressive, either through its greater intensity, or through its more agreeable timbre, or finally through its greater variety of tone, or range of pitch. And thus the fortunate possessors of voices having these superior qualities would, other things being equal, outdo their rivals. Now this triumph of rich-voiced individuals in the contests of love would have important after-results. If from generation to generation the females of a particular species continue to choose males with fine voices, there would be a gradual improvement of vocal powers generally, according to Mr. Darwin's well-known principle of sexual selection. By this means any natural superiorities of voice would tend to be preserved, and the average vocal capabilities of each succeeding generation increased. Nor is this all. Along with this increased power of producing tones, there would go an increased sensibility to the pleasurable effects of tone. And this would be brought about in two different ways. In the first place the continual performances of the male singers would, by exercising the functions of the ear, tend to raise its sensibility. In the second place it is plain that superior vocal powers in the male would, as a rule, co-exist with superior auditory sensibility; for the movements of the voice are always guided by the effects on the ear. And thus sexual selection would tend to improve the musical ear as much as the musical voice. In this way, we think, might have been developed among all musical animals, including the ancestors of man, the power of producing and of appreciating purity of tone, richness of timbre, rhythm, and melody. Little by little, the vocal organs would attain the necessary complexity, flexibility, and means of adjustment, and little by little the ear would acquire the needed nervous elements and their connections." — **Sully, J.**, in article before quoted. (*See* Index, **Sully, J.**)

It is hoped that Mr. Sully will carry out his intention to publish this careful, admirable paper in book form.

Why Birds Sing. (*See* p. 5.)

"The majority of ornithologists agree in ascribing an erotic character to the songs of birds; not only the melting melodies, but also those of their tones that are discordant to the human ear, are regarded as love-notes. Darwin finally, saving some reserves, came to accept this view. To be able to speak critically of the love-song, one should pay especial regard to the love-life of birds. It would be to throw water into the sea to add to what ornithological writers have advanced concerning the exceeding vital worth and cosmical significance of love. Nevertheless, I venture the opinion that the origin of the song-habit is to be found in other sources as well as in this important factor, among which is the joy of life, manifested in an irresistible determination to announce itself in melody; and that the song is more perfectly brought out in proportion as this feeling is more highly developed in the organization. Birds in freedom begin to sing long before pairing, and continue it, subject to interruptions, long afterward, though all passion has been extinguished; and domesticated birds sing through the whole year without regard to breeding-time, though no female or companion ever be in sight. Such birds, born in captivity, never feel the loss of freedom; and if they are well taken care of, are always hearty and in good spirits. The bird sings, to a large extent, for his own pleasure; for he frequently lets himself out lustily when he knows he is all alone. In the springtime of love, when all life is invigorated, and the effort to win a mate by ardent wooing is crowned with the joy of triumph, the song reaches its highest perfection. But the male bird also sings to entertain his mate during the arduous nest-building and hatching, to cheer the young, and if he be a domesticated bird, to give pleasure to his lord and the providence that takes care of him, and in doing so to please himself. Lastly, the bird sings — by habit, as we call it — because the tendency is innate in the organs of song[1] to exercise themselves." — **Placzeck,** *Dr.* **B. Translated from Kosmos.** (*Pop. Sci. Mo.*, vol. xxvi., p. 542.)

"The matin-song of our American robin will convince any one who observes closely that the witchery of the dewy, fragrant day-dawn is

[1] "The modifications of these organs presented by the different species are slight; the parts in all I have examined being the same, and with the same number of muscles. The peculiar song of different species must therefore depend on circumstances beyond our cognition; for surely no one could imagine the reason that the rook and the hooded crow require as complex an apparatus to produce their unmusical cries as that which the blackbird and the nightingale employ in modulating their voices, so as to give rise to those melodies which are so delightful to us; and yet the knife, and the needle, and the lens do not enable us to detect any superior organization in the warbler over the crow." — **Macgillivray.**

WHY BIRDS SING. — *Contin.*

the bird's inspiration, and no person who has heard the mocking-bird's dreamy night-lay can doubt that it is a fine expression of the nocturnal influence.

. . . . . .

"Indeed, all our birds use what we call their voices, just as we use ours, for the purposes of expression generally; and I am convinced that bird-song proper, though oftenest the expression of some phase of the tender passion, is not confined to such expression. . . . I have watched birds at their singing under many and widely differing circumstances, and I am sure that they express joyous anticipation, present content, and pleasant recollection, each as the mood moves, and all with equal ease." — **Thompson,** M.: Sylvan Secrets, pp. 74, 75, 78.

See **Spencer,** H.: Origin and Function of Music. (*Fraser's Mag.*, vol. lvi., 1857, p. 396.) (A postscript to this essay is to be found in Pop. Sci. Mo., vol. xxxviii., November, 1890.)

"The act of singing is evidently a pleasurable one; and it probably serves as an outlet for superabundant nervous energy and excitement, just as dancing, singing, and field sports do with us." — **Wallace,** A. R.: Darwinism (London, 1889), p. 284.

For criticism of Darwin's theory of the origin of bird-song, *see* **Mivart,** St. G.: Lessons from Nature, etc. (London, 1876), pp. 312–313.

Organs of Song.

On this point we are still where Father Kircher left off in 1650. If song depended on the larynx, he says, the hog would sing beautifully; adding, "*quod ridiculum ne dicam stolidum esset afferere*" (**Musurgia,** bk. 1, chap. xiv.).

See **Agassiz** and Gould: Principles of Zoölogy, pt. 1 (Boston, 1866), pp. 65–66. — **Axon,** W. E. A.: Voice of Animals. (*Brit. Alma.*, 1885, pp. 104–114.) — **Encyclo. Brit.,** vol. iii. Article "Birds," respiratory and vocal organs. — **Blanchard,** É.: Voice in Man and in Animals. Tr. by J. Fitzgerald. (*Pop. Sci. Mo.*, vol. ix., August and September, 1876, pp. 385–398, 513–523.) — **Buckland,** F.: Natural Trumpet of the Crane. (*Pop. Sci. Mo.*, vol. ix., 1876, pp. 137–140. From "Land and Water.") — **Hérissant,** *in* Memoirs of the Roy. Acad. at Paris, *quoted in* Gents. Mag., vol. xxix., 1759, pp. 119–120. — **Macgillivray,** W.: Hist. of Brit. Birds, vol. ii. p. 34. — **Müller,** J.: Researches on the comparative anatomy of the vocal organs of birds. (Berlin Akad. *Abhand.*, 1845.) — **Yarrell,** W.: Hist. of Brit. Birds, vol. ii. p. 71.

ORGANS OF SONG. — *Contin.*

INSECTS.

For musical organs and music of insects, *see* **Domestic Habits of Birds,** *Lib. of entertaining knowl.* (London, 1833), pp. 225–246 — **Musicians** of our Woods. (*Harp. Mag.*, vol. xix. 1859, pp. 323–337.) — **New Mo. Mag.,** vol. iii., pt. 3, June 1, 1827, p. 269. — **Taylor,** Charlotte: Musicians of Field and Meadow. (*Harp. Mag.*, vol. xxvi., 1862–63, pp. 495–501.)

Universal Effect of Music.

Be the scientific solution what it may, whether or not

> "'T is love creates their melody, and all
> This waste of music is the voice of love,"

we know that music is pleasurable to man, and its continuous presence throughout the animal kingdom indicates that it is pleasurable also to the beings beneath him. Why should not the subtile power of music extend from man down to the smallest creature? The author of Job and Shakespeare record its effect on the horse, and similar testimony is to be met with in all literatures ancient and modern.

MUSIC-LOVING COWS.

"Opposite to our house was a large field in which some twelve or thirteen cows were put during the summer months. One day a German band commenced to play on the road which divided the house from the field. The cows were quietly grazing at the other end of the field, but no sooner did they hear the music than they at once advanced toward it, and stood with their heads over the wall attentively listening. This might have passed unnoticed, but upon the musicians going away the animals followed them as well as they could on the other side of the wall, and when they could get no farther stood lowing piteously. So excited did the cows become that some of them ran round and round the field to try to get out, but finding no outlet returned to the corner where they had lost sight of the band; and it was some time before they seemed satisfied that the sweet sounds were really gone." — *American Naturalist.*

UNIVERSAL EFFECT OF MUSIC. — *Contin.*

HOW A CHIPMUNK FOLLOWED A FIDDLE.

"One day last week a traveller on the Newmanville road so charmed a chipmunk with music produced from a violin that the little rodent became very tame and followed him for about a mile. When the music ceased it resumed its wild nature and scampered back home." — *From the Tionesta Commonwealth.*

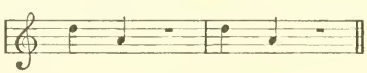
See **Animal Love of Music.** (*Harp. Mag.*, vol. xv., 1857, pp. 83–85.) — **Effect of Music** on Lower Animals. (*All the Year*, N. S. vol. xxx., Dec., 1882, p. 538.) — **Fish,** E. E.: Birds' Tastes for Color and Music. (*Pop. Sci. Mo.*, vol. xxv., 1884, pp. 715–716.) — **Hawkins,** *Sir* John: Hist. of Music, vol. ii. bk. 19, chap. 178, p. 835. — **Kircher,** A.: Musurgia, lib. ix. — **Music** of the Wild. (*Litt. Liv. Age*, vol. xxi., 1849, pp. 475–476.) — **Nat. Hist. of Birds** (Harper & Bros., 1840), pp. 241–246. — **Phenomena of Music.** (*Eclec. Mag.*, N. S. vol. ix., 1869, pp. 368–372.) — **Pontécoulant,** *Marquis* de: Les Phénomènes de la Musique. (*Lib. Internationale*, Paris, 1868.) — **Schele de Vere,** M. R. B.: Music in Nature. (*Putnam's Mag.*, N. S. vol. vi., 1870, pp. 173–182.) — **Stearns,** R. C.: Instances of the Effects of musical Sounds of Animals. (*Amer. Naturalist*, vol. xxiv., 1890, pp. 22, 123, 236.)

Effect of Music ON SNAKES. *See* **Romanes,** G. J.: Animal Intelligence, chap. ix. p. 265. ON SPIDERS, same work, chap. vi. pp. 205–207.

Æsthetic sense denied to animals. *See* **Viardot,** L., *in* Pop. Sci. Mo., vol. iv., 1873, pp. 729–735. (Trans. from *Gazette des Beaux Arts.*)

Chickadee. (*See* p. 8.)

Flagg speaks of "two very plaintive notes" of the chickadee, which he writes as follows: —



"They have a great variety of simple or quaint notes, all of which seem to be expressive of perpetual happiness, for many of them are constantly repeated throughout the year, and none are restricted to one season. Besides their well-known chant, 'chick-a-dee-dee-dee-dee,' which has given them their name,[1] they have an exquisite whistle of two notes (nearly represented by high G and F, upon the piano), which is very sweet and

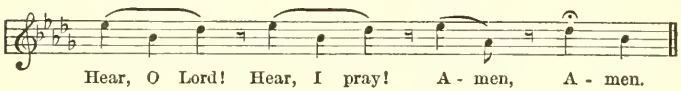
[1] The Chippewa Indians name the black-cap Kitch-i-kitch-i-gá-ne-shi.

CHICKÀDEE. — *Contin.*

clear, and various minor but equally expressive notes (among them a simple tsip), as well as certain guttural cries, one of which sounds like a rapid utterance of the French phrase "tout de suite," and is indicative, as it were, of the restless disposition of these birds." — **Minot, H. D.: Land-birds and Game-birds of N. E., p. 62.**

Wood-Pewee. (*See* p. 8; also p. 64.)

"They have all written *about* it; but I say again, it surprises me more and more that so peculiar, so plaintive, so religious a song has received almost no attention. Wilson tries to tell what he *says;* but heavens! what he *sings* is the thing to attend to. My words for his music are these: —



You see how much there is in that little, and how much of interest can be said that has never been said. And is it not interesting to find this singer and the wood-thrush in B flat minor. There; I can't afford to enlighten you further this time. The birds are an increasing wonder, and their music is by far their most wonderful endowment. It seems to me I can do something to make this plainer." — **C., S. P., in a letter dated June 17, 1885.**

Mr. Burroughs mentions the "sweet pathetic cry" of the wood-pewee; but the devotional element in the songs of these two birds seems not to have impressed the writers generally. In a delightful passage from the pen of Dr. Coues we find the song inspired by "mournful fancies."

"Wherever it may fix its home, whether in the seclusion of sylvan retreats or in the vicinity of man's abode, its presence is soon made known

WOOD-PEWEE.— *Contin.*

by its oft-repeated melancholy notes, seeming to speak some settled sorrow that time can never heal. The sighing of the pines is not more expressive of mournful fancies than the sobbing of the little sombre-colored bird, flitting apparently inconsolable through their shades." — **Stearns**, W. A.: N. E. Bird-Life, part ii. p. 29.

"The wood-pewees possess a sufficient variety of notes to characterize several species. All these sounds are nearly whistles, uttered in a plaintive and often a drawly tone. None of them are loud, and many are audible only at a very short distance. The most characteristic of these notes is *pee-u-ee*, often abbreviated to *pee-u*, and this is frequently repeated. Other syllables, less often heard, are (*ch'*) *pe-ŏ-e*, *whit*, *whit-pe'e*, and *pu pu pu pu*, uttered very softly. In addition to these there are certain querulous and guttural cries, which are employed chiefly during the season of love." **Minot**, H. D.: Land-birds and Game-birds of N. E., p. 283.

Nuttall reports the wood-pewee busy watching its "insect prey": "It then again alights as before, sometimes uttering a sort of gratulatory low twitter, accompanied by a quivering of the wings and tail; and in the lapse of its employment, in a feeble, sighing tone, often cries *pee-wee* or *pee-e'*, and sometimes *pe'-wee pewittitee* or *pewittee pe'-wee*."

See **Lunt**, H.: Across Lots (Boston, cop. 1888), p. 97.

Bluebird. (*See* p. 11.)

"The only song of the bluebirds is a repetition of a 'sadly-pleasing' but cheerful warble of two or three notes, *tinged* (so to speak) by a mournful tone. This they often give utterance to when on wing, as well as when perched. In autumn, and when with their young, their usual note is a single sad whistle; but they occasionally use a peculiar chatter as a call-note to their young, whose notes differ from those of their parents." — **Minot**, H. D.: Land-birds and Game-birds of N. E., p. 52.

"At this season [early spring] before the earnest robin pours out his more energetic lay from the orchard tree or fence-rail, the simple song of this almost domestic favorite is heard nearly alone; and if at length he be rivalled at the dawn of day by superior and bolder songsters, he still relieves the silence of late hours by his unwearied and affectionate attempts to please and accompany his devoted mate. All his energy is poured out

BLUEBIRD. — *Contin.*

into this simple ditty, and with an ecstatic feeling of delight he often raises and quivers his wings like the mocking Orpheus; and amidst his striving rivals in song, exerts his utmost powers to introduce variety into his unborrowed and simple strain." — **Nuttall, T.**: Manual of the Ornith. of the U. S. and Canada, 2d ed. (Land-birds), pp. 510–511.

Bluebird and Robin.

The hold that these familiar heralds of spring have on the heart is well illustrated by passages in "Birds of Bering Sea and the Arctic Ocean," by E. W. Nelson. One can hardly imagine the effect of a tuneful bird-song in a region so desolate and cold that the croak of the raven sounds sweeter there than the warbling of the nightingale heard from out its native boughs.

"It is a pleasant experience for one in a far-off region like this to come across the familiar forms known in other days. The sight of this bird gleaning its food about the houses on a frosty spring morning in May carries one's mind back from sterile Arctic scenery to the blossoming orchards, the hum of bees, and such other pleasant sounds and sights of Nature as go to make up a beautiful spring day in lower latitudes. One misses, however, the warbling strain of the bluebird, and the cheerless surroundings soon bring the stern reality too closely home. The birds, too, seem impressed with the gloomy surroundings, and I have never heard them utter their notes during the time of their visits to the sea-coast. In the wooded interior, however, they regain their spirits and rear their young even north of the circle; and here their cheering notes enliven the wooded river-courses during the long summer days, in striking contrast to the silence of a few months earlier, when a deathly hush made the shadows of the forests a fitting haunt for the wolf and wolverines.

"There is no record of the occurrence of the robin in Northeastern Asia that I have found, although as before mentioned it undoubtedly is a casual visitant to that region. Elliott found a single bird wind-bound upon the Seal Islands, beyond which there is no record of its occurrence on any of the islands in Bering Sea." — **Nelson, E. W.**: Birds of Bering Sea and the Arctic Ocean. (U. S. Pub. Docs., *Cruise of Corwin*, 1881.)

For description of Robin's song, *see* **Higginson, T. W.**: Out-door Papers, p. 305.

Song-Sparrow. (*See* p. 23.)

The late Mr. Harry Leverett Nelson, of Worcester, must have received much the same impression from the singing of the song-sparrow.

"At this season" [April], he writes, "this beautiful singer cannot be mistaken, uttering three or four pipes, or whistles, followed by canary-like trills and quavers, not very loud, but spirited and vivacious. There is, perhaps, no other of our birds whose song varies so much in detail and execution, though the quality and theme are always the same; and sometimes the same singer will give us five or six different variations in rapid succession without changing his perch." — **Nelson,** H. L.: Bird-songs about Worcester, p. 10.

See **Ingersoll,** E., *in* Friends Worth Knowing, chap. vii. pp. 171–181.

See also **Bicknell,** E. P.: Song-sparrow, *in his* Study of the Singing of our Birds. (*The Auk*, vol. i., 1884, pp. 65, 70; vol. ii., 1885, pp. 147–149.)

Mr. Torrey does not find the theme "always the same."

"The song-sparrow . . . will repeat one melody perhaps a dozen times, then change it for a second, and in turn leave that for a third, as if he were singing hymns of twelve or fifteen stanzas each, and set each hymn to its appropriate tune. It is something well worth listening to, common though it is, and may easily suggest a number of questions about the origin and meaning of bird music." — **Torrey,** B.: Birds in the Bush, p. 40.

"The song of the song-sparrow is sweet, lively, and poured out with an energy which doubles its charm. It has several variations, which might excusably be attributed to two or three species; but the one most often heard is that which they give utterance to in the spring. This is an indescribable song, characteristic of itself. It usually begins with a thrice-repeated note followed by the sprightly part of the music, concluding with another note which, like the first, is often tripled." — **Minot,** H. D.: Land-birds and Game-birds of N. E., p. 206.

"When he first arrives, while the weather is yet doubtful and unsettled, the strain appears contemplative, and often delivered in a peculiarly low and tender whisper, which, when harkened to for some time, will be found more than usually melodious, seeming as a sort of revery, or innate hope of improving seasons, which are recalled with a grateful, calm, and tender delight. At the approach of winter, this vocal thrill, sounding like an Orphean farewell to the scene and seasons, is still more exquisite, and

SONG-SPARROW. — *Contin.*

softened by the sadness which seems to breathe almost with sentiment, from the decaying and now silent face of Nature." — **Nuttall, T.**: Manual of the Ornith. of the U. S. and Canada, pp. 563-564.

"The song-sparrow flushes with music as soon as winter relaxes in the least, finding full voice in March, when those who have worried through the cold greet the new arrivals from the South, and all together fill a chorus to which the shrubbery resounds unceasingly, till some sharp wind comes along to remind the birds that time is fleeting, though their art be never so long. But the storm must repeat its warnings to dampen even an ardor that is never entirely quenched; for passion lingers long in the breasts that have once felt the glow, and it takes a good while to sober the song-sparrows after their summer's hey-day. We still hear their trill, like a memory rather than a hope, when the woods and fields have reached the golden gates of fruition." — **Stearns, W. A.**: New England Bird-Life (ed. by Dr. Elliott Coues), part i. p. 257.

For interesting notes on song periods, the effect of the moult and fatness on the singing of birds, and on the peculiarities of vocal delivery, etc., *see* **Bicknell, E. P.**: A Study of the Singing of our Birds. (*The Auk*, vol. i., 1884, pp. 60, 126, 209, 322; vol. ii., 1885, pp. 144, 249.)

White-bellied Nuthatch. (*See* p. 29.)

This briefest paper of all throws more light on the character of the author than many of the longer ones. At the time it was written he was surrounded by affectionate friends, and yet he could say that this little sprite was one of the most "intimate" and "important" of them. The words are literally true. Almost the last thing he wrote was a further description of this bird:

"On the coldest winter day, when all seems turning to ice, what staggers our reason and commands our admiration more than to see a bit of flesh and bone not larger than your thumb, done up in feathers in such a way as to defy the cold, darting round, running up and down rough sides of the great forest-trees, with his little wire

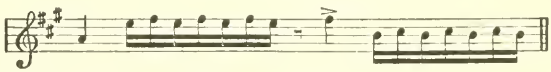
WHITE-BELLIED NUTHATCH. — *Contin.*

legs not larger than a darning-needle and quite as naked, and toes the size of a hair, with an activity and rapidity reminding us of electricity itself? And this is only his regular exercise while getting his breakfast."

Field-Sparrow. (*See* p. 35.)

"I find more and more that the birds extemporize,[1] and that those of the same species do not sing alike. All summer in Lynn the field-sparrows 'went up' *accelerando é crescendo.* Here, twenty times a day, I hear them going down, down every time, and diminishing, — just reversing it. It is a 'queer' thing, but there is no mistake about it. Again, the indigo-bird sings nothing here that I heard from him in Lynn.

"But nobody can tell me what 'feller' sings, —



He is the 'lost chord.' I knew the song well when a boy; heard it once at Maple Grove, but could not see the bird." — **C.**, S. P. in a letter dated August, 1888.

"I must not omit to say that occasionally one may hear the field-sparrow reverse the order of the melody here given by descending after the opening monotones." — Note written by the author on his field-sparrow paper after its appearance in the Century Magazine.

[1] *See* Index, **Extemporizing.**

FIELD-SPARROW. — *Contin.*

Mr. Torrey gives much the same description of the field-sparrow. He finds the song, however, a "strict monotone": —

"One more of the innovators (these heretics, as they are most likely called by their more conservative brethren) is the field-sparrow, better known as *Spizella pusilla*. His usual song consists of a simple line of notes, beginning leisurely, but growing shorter and more rapid to the close. The voice is so smooth and sweet, and the acceleration so well managed, that, although the whole is commonly a strict monotone, the effect is not in the least monotonous. This song I once heard rendered in reverse order, with a result so strange that I did not suspect the identity of the singer till I had crept up within sight of him. Another of these sparrows, who has passed the last two seasons in my neighborhood, habitually doubles the measure, going through it in the usual way, and then, just as you expect him to conclude, catching it up again, *Da capo*." — **Torrey, B.**: Birds in the Bush, pp. 39-40.

Linnet. (*See* p. 37.)

"There is a strong resemblance to the song of the warbling vireo, and it was undoubtedly this finch which Thoreau tells us in his Journal he heard in April, and was unable to identify." — **Nelson, H. L.**: Bird-songs about Worcester, p. 25.

"He stands at the head of the finches, as the hermit at the head of the thrushes." — **Burroughs, J.**: Wake-robin, p. 69.

White-throated Sparrow. (*See* p. 42)

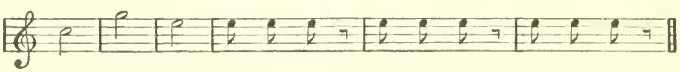
"Notwithstanding the slighting manner in which the song of this bird is spoken of by some writers, in certain parts of the country its clear, prolonged, and peculiar whistle has given to it quite a local fame and popularity. Among the White Mountains, where it breeds abundantly, it is known as the peabody bird, and its remarkably clear whistle resounds in all their glens and secluded recesses. Its song consists of twelve distinct notes, which are not unfrequently interpreted into various ludicrous travesties. As this song is repeated with no variations, and quite frequently from early morning until late in the evening, it soon becomes quite monotonous." — **Baird, Brewer, and Ridgway**: North American Birds, vol. i., Land-Birds, p. 576.

WHITE-THROATED SPARROW. — *Contin.*

"The ordinary note of the white-throated sparrows is a rather feeble 'tseep,' much like that of the fox-colored sparrows, and indeed of other birds. Their song is sweet, clear, and exquisitely delicate, consisting of whistled notes which have been likened to the words, 'Old Sam Peabody, Peabody, Peabody, Peabody.' This song is often somewhat varied, and again snatches or parts of it are sometimes sung. It is more often whistled in the morning and at evening than at any other times of the day, and it may be sometimes heard at night." — **Minot, H. D.:** Land-birds and Game-birds of N. E., p. 219.

"In New England, the song of the green warbler is interpreted as a prayer to Saint Theresa. In Michigan, a lover of bird-music has given the same interpretation to the song of the white-throated sparrow, *Zonotrichia albicollis, Bonap.* The latter is heard sometimes in the natural groves bordering the outskirts of the newer villages, in the northern part of the State, but generally only in the wilder and more desolate depths of the forest. The notes are inimitably clear, sweet, and plaintive; and it requires only a moderate play of the imagination to convert the song into the petition, 'Oh hear me, Theresa, Theresa, Theresa!'

"It is not easy to express bird-songs by musical notation. In this case we may approximate success by using the flute stop of a cabinet organ, giving a half-note each in C, G, and E of the second octave of the treble clef, followed lightly by three eighth-notes and an eighth-rest in E, twice repeated, as follows: —



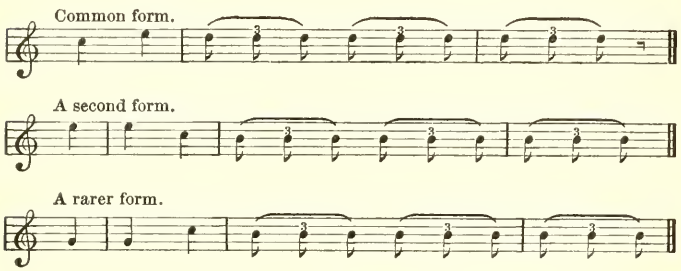
"The first three measures correspond to the words 'Oh hear me,' and the last three to the name of the saint, 'Theresa,' three times pronounced, with the accent on the first syllable. The arrangement of musical sounds indicated above appears to constitute the most perfect and complete form of the song; but it is varied in different localities and by different performers, as if among birds of the same species there were different degrees of musical talent and different fashions in musical education. In one place, where I had excellent opportunities to listen, the last three measures were seldom heard,[1] or when heard, consisted each of a half-note. Of the first three half-notes, one or other is sometimes omitted. The song is sometimes heard in the night.

[1] Was not this due rather to the season than to the place? *See* p. 43.

WHITE-THROATED SPARROW. — *Contin.*

"I suspect this interesting bird is an accomplished ventriloquist. On one occasion I listened for some time to what seemed to be two birds, in different directions and not far off, but hidden from view. The C note was omitted. One would sing two notes in G, which would be followed in perfect time by two in E by the other bird. I was strongly impressed at the time with the idea that there was only one singer present, and that the song, sweet and beautiful, was a skilful display of ventriloquism." [1] — **Leach,** M. L.: Song of the White-throated Sparrow. (*Swiss Cross*, vol. iii., May, 1888, pp. 145-146.)

Dr. Leach's notation is very similar to that of the white-throat's song as heard in the provinces of New Brunswick and Nova Scotia, — "as clear and accurate a melody as can be given forth by any human songster": —



If we rule out the testimony of Juliet about the lark, this writer has the honor of being perhaps the second to

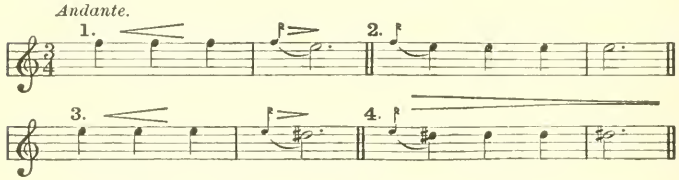
[1] "I first heard it [the ventriloquist dove (*Geopelia tranquilla, Gould*)] on the marshes of the Macquarie, but could not see it. The fact is that it has the power of throwing its voice to a distance, and I mistook it for some time for the note of a large bird on the plains, and sent a man more than once to shoot it, without success." — **Sturt,** *Capt.* C.: Narr. of an Exped. into Central Australia (Lond., 1849), vol. ii. app. p. 45. *See* **Müller,** Karl: Ein Lieblingsvogel des Volkes. (*Gartenlaube,* 1876, p. 300.)

For ventriloquism explained by rapid changes of position, *see* **Jefferies,** R.: Wild life in a Southern County (Boston, 1889), pp. 195, 196.

WHITE-THROATED SPARROW. — *Contin.*

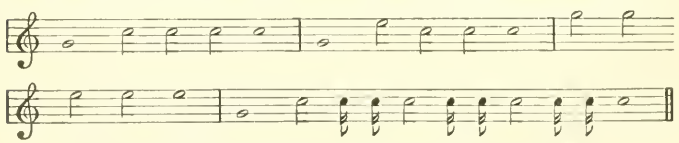
report that the birds sing out of tune: "The B in the last form was often sung most outrageously flat." — **Goodwin, W. L.:** Music in Nature. (*Nature*, vol. xxxvii., 1887–88, pp. 151–152.)

A. G. Wilkinson heard what he took for the white-throat's singing on the Dartmouth River. "Between each double bar is a single song. Numbers 1 and 2 are different songs of one bird, and Numbers 3 and 4 are songs of another bird": —



(*In* **Mayer, A. M.,** *ed.:* Sport with Gun and Rod, p. 436.)

"There is one other bird worthy of distinction from a similar quality of music. I refer to the white-throated sparrow. I give their song, like the thrush's, a simple melody, and yet, like the thrush's, true to the human scale, and of course true to the law of harmony. I awoke, one morning, five thousand feet above tide-water, to a concert of these birds, such as no man ever heard at a lower elevation, and such as I never expect to hear repeated. There seemed to be half a dozen within a stone's throw, and all pouring out their welcome to the new day. But mind you this fact, it was a solo concert; as each in turn uttered its simple melody, not one infringed on the time of another or gave a note except in regular succession. I marked four distinct variations in their song, which I give, and which you will see are all common chords of the human scale:" —



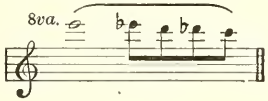
(**Horsford, B.,** in a letter to the Editor, dated October, 1890.)

See **Burroughs, J.:** Wake-robin, p. 87.

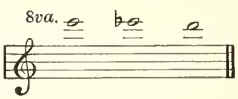
WHITE-THROATED SPARROW. — *Contin.*

The typical songs of two Pacific coast cousins of the white-throat are recorded *in* Zoe, vol. i., 1891, p. 72, by C. A. Keeler.

GAMBEL'S WHITE-CROWNED SPARROW.
(*Z. leucophrys gambeli.*)



GOLDEN-CROWNED SPARROW.
(*Z. Coronata.*)



Morning Song.

Mr. Horsford having given us an account of a morning concert in New England, let us listen to a report of one in the "gorgeous and sunny Jamaica": —

"In these excursions I was interested in marking the successive awakening of the early birds. Passing through the wooded pastures and Guinea-grass fields of the upland slopes, while the stars were twinkling overhead; while as yet no indication of day appeared over the dark mountain-peak, no ruddy tinge streamed along the east; while Venus was blazing like a lamp, and shedding as much light as a young moon, as she climbed up the clear, dark heaven among her fellow-stars, — the night-jars were unusually vociferous, uttering their singular note, 'wittawittawit,' with pertinacious iteration, as they careered in great numbers, flying low, as their voices clearly indicated, yet utterly indistinguishable to the sight from the darkness of the sky across which they flitted in their triangular traverses. Presently the flat-bill uttered his plaintive wail, occasionally relieved by a note somewhat less mournful. When the advancing light began to break over the black and frowning peaks, and Venus waned, the peadove from her neighboring wood commenced her fivefold coo, hollow and moaning. Then the petchary, from the top of a tall cocoa-palm, cackled his three or four rapid notes, "OP, PP, P, Q;" and from a distant wooded hill, as yet shrouded in darkness, proceeded the rich, mellow, but broken song of the hopping-dick-thrush, closely resembling that of our own blackbird. Now the whole east was ruddy.

. . . . . .

WHITE-THROATED SPARROW. — *Contin.*

"The harsh screams of the clucking hen came up from a gloomy gorge, and from the summit of the mountain were faintly heard the lengthened flute-like notes, in measured cadence, of the solitaire.[1] Then mocking-birds all around broke into song, pouring forth their rich gushes and powerful bursts of melody, with a profusion that filled the ear, and overpowered all the other varied voices, which were by this time too numerous to be separately distinguished, but which all helped to swell the morning concert of woodland music." — **Gosse, P. H.**: Romance of Nat. Hist., pp. 17–18.

For night songs *see* Index, **Night Songs.**

RHYTHM.

The author asserts of the white-throated sparrow that the "charm of his song lies in the rhythm." The writers on bird music are quite at odds on the point of rhythm. Mr. Maurice Thompson says: —

"There is no such an element as the rhythmic beat in any bird-song that I have heard. Modulation and fine shades of 'color,' as the musical critic has it, together with melodious phrasing, take the place of rhythm. The meadow-lark, in its mellow fluting, comes very near to a measure of two rhythmic beats, and the mourning dove puts a throbbing cadence into its plaint; but the accent which the human ear demands is wholly wanting in each case.

. . . . . .

"The absence of true rhythm probably is significant of a want of power to appreciate genuine music, the bird's comprehension compassing no more than the value of sweet sounds merely as such." — **Thompson, M.**: Sylvan Secrets, pp. 77, 83.

Mr. Thompson offers the suggestion that the "chief difference between the highest order of bird-music and the lowest order of man-music is expressed by the word rhythm." It is more natural to suspect that the order of development in bird melody is similar to that in human melody, hence that rhythm is the first step. At any rate,

[1] *See* Index, **Solitaire.**

WHITE-THROATED SPARROW. — *Contin.*

we may go so far as to say with Mr. Tully that there is in bird music "clearly an adumbration of the simpler forms of rhythm."

See Index, **Beckler** (note). *See also* Index, **Cuckoo**; *also* **Hermit Thrush,** where the song is reported as suggesting the "opening of a grand overture."

Fox-colored Sparrow. (*See* p. 44.)

Mr. Torrey finds a "thrush-like" quality in the song of the fox-sparrow; more, however, of the cardinal grosbeak. (A happy report of a song contest between a fox-sparrow and a song-sparrow is to be found in his "Birds in the Bush," pp. 219–220.) Mr. Burroughs speaks briefly but decidedly: —

"It is a strong, richly modulated whistle, the finest sparrow note I have ever heard." — **Burroughs, J.** : Wake-robin, p. 163.

"During their stay in the United States these birds keep in small distinctive flocks, never mingling, though often in the same places, with other species. They are found in the edge of thickets and in moist woods. They are usually silent, and only occasionally utter a call-note, low and soft. In the spring the male becomes quite musical, and is one of our sweetest and most remarkable singers. His voice is loud, clear, and melodious; his notes full, rich, and varied; and his song is unequalled by any of this family that I have ever heard." — **Baird, Brewer, and Ridgway**: North Am. Birds. Land-Birds, vol. ii. p. 52.

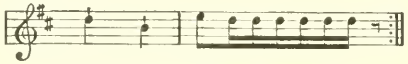
Chewink. (*See* p. 45.)

Mr. Torrey, too, finds the chewink "taking liberties with his score": "He carries the matter so far that sometimes it seems almost as if he suspected the proximity of some self-conceited ornithologist, and were determined, if possible, to make a fool of him" (*In his* Birds in the Bush, p. 39).

CHEWINK. — *Contin.*

See Index, **Extemporizing.** *See also* **Knapp, J. L.**: Eng. Song Thrush, *in his* Journal of a Naturalist (London, 1838), p. 270.

Mr. Flagg seems not to find that the chewink extemporizes. "His song," he says, "consists of two long notes, the first about a third above the second, and the last part made up of several rapidly uttered liquid notes, about one tone below the first note:" —



In his A Year with the Birds, p. 96.

Mr. Flagg and our author are far apart on the more common song of the chewink.

Yellow Warbler. (*See* p. 47.)

Mr. Nelson's description of this song could not follow closer the musical notation in the present volume had it been written with the music before his eyes: "Five or six pipes, ending abruptly in a sharp quaver, the whole uttered with great rapidity."

Yellow Warbler and Goldfinch.

Between the vocal powers of this bird and the goldfinch, (*Chrysomitris tristis*), indiscriminately classed with him as one of the "yellow-birds," there is a noteworthy difference. The goldfinch is a rival of his famous relative, the canary: —

"No one of our birds has a sweeter voice than the goldfinch, and its plaintive *che-wé, che-wéah* as it balances on an aster-head, or rises and falls

YELLOW WARBLER AND GOLDFINCH. — *Contin.*

in its billowy flight, is one of the most delicious of rural sounds. But in spring the male has a love-song excelled by few other birds. It is 'sweet, brilliant and pleasing . . . now ringing like the loud voice of the canary, now sinking into a soft warble.'" — **Ingersoll, E.,** *and others:* Habits of Animals.

Chestnut-sided Warbler. (*See* notation on p. 49.)

[The song of the chestnut-sided warbler] "is attractive and musical, though containing but a few simple notes. One variation resembles the syllables weé-see-weé-see-weé-see (each of which is higher than the preceding, except the sixth, which is lower than the fifth). The other common variation is almost exactly like the song of the little yellow-bird, and consequently like that of various other warblers." — **Minot, H. D.:** Land-birds and Game-birds of N. E., p. 108.

See **Lunt, H.:** Across Lots, p. 122.

Mr. Burroughs describes the song of the chestnut-sided warbler as "fine and hurried."

Black-throated Green Warbler. (*See* p. 48.)

"This song is something like the syllables *ta-te-te-ît-tă-tee*, uttered in a plaintive tone, — the first syllable low, the second higher, the third and fourth quickly together and high, and the fifth and sixth a little slower and lower. Its song is peculiar, and cannot be confounded with that of any other warbler in New England." — **Samuels, E. A.:** Our Northern and Eastern Birds, p. 224.

"The ordinary notes of the 'black-throated greens' are numerous, being a *tsip*, a *chick*, which is sometimes soft and sometimes loud, a *check*, a *chuck*, which is used chiefly as a note of alarm, and a sharp *chink*, which is generally indicative of distress. Their song has several variations, of which the two most often heard are *weé-see-weé-see-weé-see* (in which the middle notes are the highest) and wēē-sēē-wée-see-sēē (in which the second note is higher than the rest, the second couplet uttered in a lively way, and the other notes drawled out in a manner peculiar to this species). To these simple chants a few terminal notes are not infrequently added, which sometimes consist of a repetition, and rarely resemble those of the 'black-throated blue's' music. These songs are very characteristic; and if one has once heard them, he cannot often confound them with those of other birds." — **Minot, H. D.:** Land-birds and Game-birds of N. E., p. 119.

BLACK-THROATED GREEN WARBLER. — *Contin.*

See **Lunt,** H.: Across Lots, p. 72.

Nuttall describes the black-throat's song as a "quaint and indolent ditty."

For a pleasant chat about the warblers *see* **Amory,** Catherine: Birds in Wood and Field. (*Swiss Cross,* vol. iv., 1888, no. 6, p. 162.)

Redstart. (*See* p. 51.)

Mr. Cheney was taking his bird-songs at Lynn and Franklin while Mr. Nelson was making observations at Worcester, and their reports — though neither knew of the existence of the other — are even nearer together than the localities where they were engaged.[1] Mr. Nelson describes the redstart's song as "much resembling that of the yellow warbler, though considerably shorter and weaker."

"The song of the redstart is simple and pleasing, but constantly varied. Sometimes it is merely a rather shrill *che-wée-o* or *che-wée-o-wée-o,* at other times it is *che-wée-see-wée-see-see-wée,* or a soft *wée-see-wée-see-see-wée,* much like the song of the yellow-bird (*D. æstiva*), and again a series or repetition of a few gentle notes, which form an indefinite song." — **Minot,** H. D.: Land-birds and Game-birds of N. E., p. 131.

"Nuttall's description of the movements of this brisk bird sounds like one of the happier passages of Homer:

"He does not, like the loitering pewee, wait the accidental approach of the insect prey; but carrying the war amongst them, he is seen flitting from bough to bough, or at times pursuing the flying troop of winged insects from the top of the tallest tree in a zig-zag, hawk-like, descending flight, to the ground, while the clicking of the bill declares distinctly both his object and success."

See also **Lunt,** H.: Across Lots, p. 103.

[1] For another instance of close agreement with a second reporter *see* Index, **Wood Thrush.**

Cat-bird. (*See* p. 52.)

"Next after the thrasher and the mocking-bird, 'prince of song,' the palm must be awarded to this humble tenant of the shrubbery for power of mimicry and range of vocalization, as well as for sweetness of execution in singing." — **Stearns,** W. A.: N. E. Bird-life (ed. by Dr. E. Coues), part i. p. 64.

See **Our Birds.** (*New Eng. Mag.*, vol. i., 1831, pp. 227–230.)

Brown Thrush. (*See* p. 54.)

"Our brown thrush is a magnificent singer, albeit he is not of the best school, being too 'sensational' to suit the most exacting taste. His song is a grand improvisation: a good deal jumbled, to be sure, and without any recognizable form or theme; and yet, like a Liszt rhapsody, it perfectly answers its purpose, — that is, it gives the performer full scope to show what he can do with his instrument. You may laugh a little, if you like, at an occasional grotesque or overwrought passage, but unless you are well used to it you will surely be astonished. Such power and range of voice; such startling transitions; such endless variety! And withal such boundless enthusiasm and almost incredible endurance! Regarded as pure music, one strain of the hermit thrush is to my mind worth the whole of it; just as a single movement of Beethoven's is better than a world of Liszt transcriptions. But in its own way it is unsurpassable." — **Torrey,** B.: Birds in the Bush, p. 117.

"The song of this bird is difficult of description: it is a sort of confused mixture of the notes of different birds, or rather seems to be, but is really its own song, as different individuals all sing nearly alike. The fact that it resembles the Mocking-bird in its medley of notes has caused it to be called, in some localities, the Brown Mocker; and it is also sometimes called the Mavis and Nightingale, from its habit of singing in the night during the mating season." — **Samuels,** E. A.: Our Northern and Eastern Birds, p. 165.

For a tribute to the thrasher's genius by one that "crowns and anoints him Prince of the Poets of the Wild-wood," *see* **Munger,** C. A.: "Four Amer. Birds." (*Putnam's Mag.*, N. S. vol. iii., 1869, pp. 728–729.)

Night Songs.

This nightingale by no means has the night to himself. Not to speak of our home birds, the choir of his fellow

NIGHT SONGS. — *Contin.*

singers across the water is large and strong enough for broad day.

"Within one hour, from 11.30 P. M. to 12.30 A. M., I heard the cuckoo, nightingale, thrush, wood-lark, reed-wren, white-throat, willow-wren. Soon after 1 A. M. I heard, in addition to the foregoing, the chaffinch, the wren, and the chiff-chaff; and after two o'clock there was such a general mingling of voices that it was possible only to distinguish the thrush, cuckoo, chaffinch, and robin, whose utterances are so distinct as to be at all times unmistakable. Far away on the borders of the New Forest, and among the crowded slopes of Herefordshire, I have at night heard the golden oriole, the ring-ousel, the water-ousel, and the gray wag-tail, — the last to be seen as well as heard during moonlight at the midnight hour; but none of these, so far as I know, visit the gardens near London." — **Hibberd**, S.: Minstrels of the Summer. (*Intellectual Observer*, vol. ii., Aug., 1862, p. 19)

Mocking-bird of Jamaica.

"It is in the stillness of the night, when like his European namesake [the nightingale], he delights —

'With wakeful melody to cheer
The livelong hours,'

that the song of this bird is heard to advantage. Sometimes, when, desirous of watching the first flight of *Urania Sloaneus*, I have ascended the mountains before break of day, I have been charmed by the rich gushes and bursts of melody proceeding from the most sweet songster, as he stood on tiptoe on the topmost twig of some sour-sop or orange-tree, in the rays of the bright moonlight. Now he is answered by another, and now another joins the chorus from the trees around, till the woods and savannahs are ringing with the delightful sounds of exquisite and innocent joy." — **Gosse**, P. H.: Birds of Jamaica (London, 1847), p. 145.

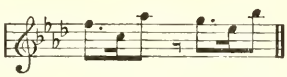
Wood Thrush. (*See* p. 56.)

"But how much there is to learn![1] And I cannot find it in the books. I am more and more astonished that the

[1] "His [the author's] method of work was to ascertain the haunts of the birds whose songs he wished to secure, and to seek them there, some-

WOOD THRUSH. — *Contin.*

music of the birds has received so little attention. The other evening I heard these notes: —



Is it not wonderful that a bird should give so exquisite a succession of tones? No human genius can surpass it. I repeat it, the birds have found out the beautiful and have been our teachers." — **C.**, S. P., in a letter dated June 17, 1885.

"In elaborate *technique* and delicious *portamento*, it surpasses all the other thrushes. . . . The wood thrushes, more than any other birds I know of, exhibit various degrees of excellence, some individuals singing much more beautifully than others." — **Nelson**, H. L.: Birds songs about Worcester, p. 46.

For variations in songs of birds of the same species, *see* Index: **Songs**, Variations in.

"The song of this thrush is one of its most remarkable and pleasing characteristics. No lover of sweet sounds can have failed to notice it, and having once known its source, no one can fail to recognize it when heard again. The melody is one of great sweetness and power, and consists of several parts, the last note of which resembles the tinkling of a

---

times with a friend, but oftener alone with his pitch-pipe and a scrap of music-paper. When successful, he would return, elated and beaming, to talk about his experience, and transfer the song he had taken, after writing it carefully over, to a sheet of music paper, for reference when he should write up the description, later.

"He said that the first song of a bird, or rather on hearing a song for the first time, it did not present itself clearly to his mind. It was only after several repetitions that he unravelled it and was able to write it out.

"When at work, writing up his descriptions, he usually preferred to be alone, but invariably would wish to read aloud what he had written and talk about it, and would generally end by saying, even though changes were suggested, 'Well, I 'll send it to ——— just as it is and see what he says to it.' His best work was always done in the morning or first part of the day." — **Cheney**, *Mrs.* Julia C., in a letter to the editor, dated July 14, 1890, Franklin, Mass.

WOOD THRUSH. — *Contin.*

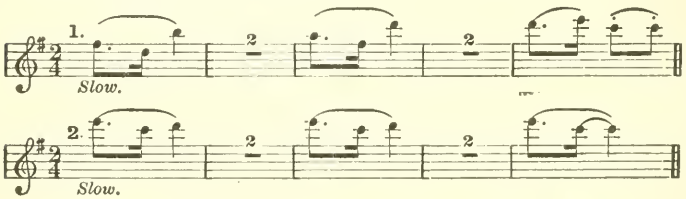
small bell, and seems to leave the conclusion suspended. Each part of its song seems sweeter and richer than the preceding." — **Baird, Brewer,** and **Ridgway:** North American Birds. Land-Birds, vol. i p. 9

"The prelude to this song resembles almost the double-tonguing of the flute, blended with a tinkling, shrill, and solemn warble, which re-echoes from his solitary retreat like the dirge of some sad recluse, who shuns the busy haunts of life. The whole air consists usually of four parts, or bars, which succeed in deliberate time, and finally blend together in impressive and soothing harmony, becoming more mellow and sweet at every repetition." — **Nuttall,** T.: Manual of Ornithology, p. 391.

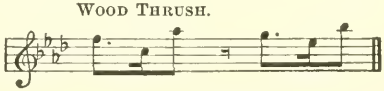
See **Our Birds.** (*New Eng. Mag.*, vol. i., 1831, pp. 330–331.)

Big-tree Thrush.

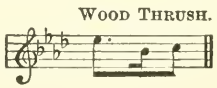
Mr. L. Belding, in his paper, "The Small Thrushes of California" (Calif. Acad. Sci., *Proceedings*, 2d ser., vol. ii., Oct. 1, 1889, pp. 68, 69), gives the song of the big-tree thrush (*Turdus sequoiensis*).



Compare first two measures of No. 1 with this: —



And first measure of No. 2 with this: —



BIG-TREE THRUSH. — *Contin.*

Mr. Belding writes under date January 6, 1891 : —

"I am familiar with the songs of the veery, of *Mustelinus*, and all which breed in Northern Pennsylvania. The tone of *T. Sequoiensis* is strikingly different from that of any thrush I know, though it is remarkable that its most frequent song has the identical intervals that the wood thrush has. I have listened to the song of *T. Sequoiensis* many, many hours, usually toward evening, often when it was quite dark."

Tawny Thrush. (*See* p. 58.)

"The song of this thrush is quaint, but not unmusical; variable in its character, changing from a prolonged and monotonous whistle to quick and almost shrill notes at the close. Their melody is not unfrequently prolonged until quite late in the evening, and in consequence in some portions of Massachusetts these birds are distinguished with the name of Nightingale, — a distinction due rather to the season than to the high quality of their song. Yet Mr. Ridgway regards it, as heard by himself in Utah, as superior in some respects to that of all others of the genus, though far surpassed in mellow richness of voice and depth of metallic tone by that of the Wood Thrush (*T. mustelinus*). To his ear there was a solemn harmony and a beautiful expression which combined to make the song of this surpass that of all the other American Wood Thrushes. The beauty of their notes appeared in his ears 'really inspiring, their song consisting of an inexpressibly delicate metallic utterance of the syllables *ta-weel' ah, ta-weel' ah, twil' ah, twil' ah,* accompanied by a fine trill which renders it truly seductive.' The last two notes are said to be uttered in a soft and subdued undertone, producing thereby, in effect, an echo of the others." — **Baird, Brewer, and Ridgway**: North Amer. Birds. Land-Birds, vol. i. p. 10.

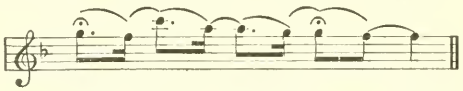
Mr. Nelson regards the veery's as the most "spiritual" of all bird-songs; Nuttall prefers the song of the wood-thrush.

See **Our Birds.** (*New Eng. Mag.*, vol. i. 1831, p. 332.)

"All bird-songs are delicate things. It is impossible to represent them in all respects. One can give only the naked frame-work. The quality of tone and a thousand graceful touches can only be heard. If ever my bird-songs

TAWNY THRUSH. — *Contin.*

come before the public, I shall expect to hear people generally say, as they look at them, 'Why! is that all!' etc., etc. The song of the Wilson thrush is an illustration of what I mean. It is very short, but nothing can exceed its bewitching beauty. It is all on the swing and jingle:"



Letter from S. P. C. to Franklin Fairbanks, Esq., dated Jan. 3, 1886.

Hermit Thrush. (*See* p. 59.)

Mr. Nelson, in a careful comparison of the singing of this thrush with that of the wood thrush and of the veery, makes it stand out very distinctly. With his accustomed accuracy, he mentions the abrupt change of key. (*In his* Bird-songs about Worcester, p. 111.)

Mr. Burroughs describes the hermit's song as higher in key, "more wild and ethereal," than that of the wood thrush. "His instrument is a silver horn, which he winds in the most solitary places. The song of the wood thrush is more golden and leisurely. Its tone comes near to that of some rare stringed instrument." But finer than all, the hermit's song is to him "the voice of that calm, sweet solemnity one attains to in his best moments. It realizes a peace and a deep solemn joy that only the finest souls may know." (*In his* Wake-robin, pp. 33, 60.)

As Samuels heard the song of this thrush it was so similar to that of the wood thrush that for a long time he supposed it to be the wood thrush that was singing. Not so Nuttall: —

HERMIT THRUSH. — *Contin.*

"This species, so much like the nightingale in color, is scarce inferior to that celebrated bird in its powers of song, and greatly exceeds the wood thrush in the melody and sweetness of its lay." — *In his* Manual of Ornithology, etc., p. 394.

"The song of this species is very fine, having many of the characteristics of that of the Wood Thrush (*T. mustelinus*). It is as sweet, has the same tinkling sounds, as of a bell, but is neither so powerful nor so prolonged, and rises more rapidly in its intonations. It begins with low, sweet notes, and ends abruptly with its highest, sharp, ringing notes." — **Baird, Brewer, and Ridgway**: North American Birds. Land-Birds, vol. i. p. 19.

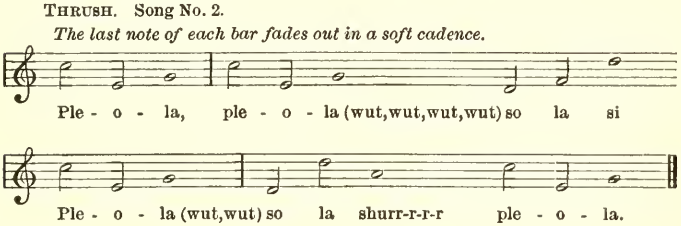
"At times the hermit thrush is heard chanting a low and musical song, but it is destitute of those sweet, clear, and rich tones which characterize the song of the wood thrush." — **Giraud, J. P., *Jr.***: Birds of Long Island, p. 90.

See **Horsford,** B.: Our Wood Thrushes. (*Forest and Stream*, vol. xviii., May 25, 1882.)

Mr. Horsford writes that song No. 2 of this article should read as follows: —

THRUSH. Song No. 2.

The last note of each bar fades out in a soft cadence.



For further description of songs of the thrushes, *see* **Amory,** Catherine: Birds in May. (*Swiss Cross*, vol. iii. no. 6, p. 1.) — **Higginson,** T. W.: Outdoor Papers, pp. 306–310. — **Nehrling,** H.: North Amer. Birds, part. i.

Oven-Bird. (*See* p. 62.)

Mr. Nelson was fortunate enough to hear the song heard by others. To him it was a "delicious warble" and a "love song."

OVEN-BIRD. — *Contin.*

"The ordinary song of the oven-bird, but for its inseparable association with the quiet recesses of summer woods, would certainly seem to us monotonous and commonplace; and the bird's persistent reiteration of this plain song might well lead us to believe that it had no higher vocal capability. But it is now well known that, on occasions, as if sudden emotions carried it beyond the restrictions that ordinarily beset its expression, it bursts forth with a wild outpouring of intricate and melodious song, proving itself the superior vocalist of the trio of pseudo-thrushes of which it is so unassuming a member. This song is produced on the wing, oftenest when the spell of evening is coming over the woods. Sometimes it may be heard as an outburst of vesper melody carried above the foliage of the shadowy forest and descending and dying away with the waning twilight." — **Bicknell**, E. P.: A Study of the Singing of our Birds. (*The Auk*, vol. i., July, 1884, p. 214.)

See **Burroughs**, J.,: Wake-robin, pp. 65–66. — **Lunt**, H.: Across Lots, p. 99.

Limit of Verbal Description.

That the oven-bird has a beautiful song is beyond question, but many as the descriptions of it may be, can we get from these a true idea of it, or of the song of any other bird? The shape, size, color, habits, and haunts of the bird are within reach of patience and care; but to fasten the song, the "spirit," as our author terms it, — there it is that difficulty begins. The most accurate musical notation cannot hope to reproduce the tone and manner of delivery; by how much the more is it true that words must fail to approximate a report of what the birds say. The oven-bird is a case in point: —

"Audubon calls it [the song of the oven-bird] a 'simple lay' and again 'a short succession of simple notes,' — expressions that would give one who had never heard its song an altogether incorrect idea of its true character. Wilson is still more in error when he states that this bird has no song, but an energetic twitter, when in fact it has two very distinct

LIMIT OF VERBAL DESCRIPTION. — *Contin.*

songs, each in its way remarkable. Nuttall describes its song as 'a simple, long, reiterated note, rising from low to high, and shrill;' Richardson speaks of it as 'a loud, clear, and remarkably pleasing ditty;' and Mr. Allen calls it 'a loud, echoing song, heard everywhere in the deep woods.' — **Baird, Brewer, and Ridgway**: North American Birds. Land-Birds, vol. i. p. 282.

Night-Hawk. (*See* p. 66.)

"At early evening, and in cloudy weather throughout the greater part of the day, he ascends into the air; and when he has attained a considerable height, partially closing his wings, he drops with great velocity through the distance of seventy-five or one hundred feet, sometimes nearly to the earth. The sound made by the air passing through the wing quills is so loud that I have often heard it at certainly the distance of half a mile; it resembles, as Nuttall truly says, the sound produced by blowing into the bung-hole of an empty hogshead. This act is often repeated, the bird darting about at the same time in every direction, and uttering his sharp *squeak*. Wilson was of the opinion that this habit of the Night-Hawk was confined to the period of incubation; the male acting in this manner, as he thought, to intimidate any person from approaching the nest. I have had abundant opportunities for observing the bird in all times of the summer, and during its stay with us; and I should unhesitatingly affirm that from the time of early courtship until the young are hatched, if not after, the male acts in this manner." — **Samuels, E. A.**: Our Northern and Eastern Birds, p. 123.

"The male Night 'Hawk' produces an equally extraordinary sound, which is heard chiefly during the season of courtship. Mounting to some height, he falls, head foremost, until near the ground, when he checks his downward course; and then the 'booming' is heard, a sound 'resembling that produced by blowing strongly into the bung-hole of an empty hogshead.' I am uncertain as to what causes this noise, having found it impossible to make any close observations. Wilson thought it produced by the mouth, Audubon, by the concussion caused by a change of position in the wings." — **Minot, H. D.**: Land-birds and Game-birds of N. E., p. 299.

Whippoorwill. (*See* p. 68.)

"The whippoorwill interested me very much. He sings in thirds, no other intervals, — just the same always. I had

WHIPPOORWILL. — *Contin.*

good opportunities with him." — C., S. P., in a letter dated September, 1886.

"Rhythmical chain." *See* Index, **Rhythm.**

Flagg says that the similarity between the notes of this bird and those of the quail is so great that they might be taken as identical. As here given, both the rhythm and the intervals are very different. (*In his* A Year with the Birds, pp. 197–198.)

Oriole. — *Variations in bird-song.* (*See* p. 71.)

One of the foremost among our naturalists, Mr. J. A. Allen, had the good fortune to hear an unusual oriole song. Speaking of the variation in the vocal powers of birds of the same species, he says: —

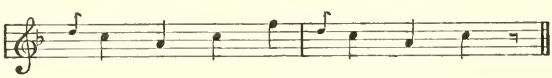
"But the strangest example of this sort I have noticed, I think, was the case of an Oriole (*Icterus Baltimore*) that I heard at Ipswich last season. So different were its notes from the common notes of the Baltimore that I failed entirely to refer them to that bird till I saw the author. So much, however, did it resemble a part of the song of the Western Meadow Lark (*Sturnella magna; S. neglecta, Aud.*) that it at once not only recalled that bird, but the wild, grassy, gently undulating primitive prairie landscape where I had heard it, and with which the loud, clear, rich, mellow tones of this beautiful songster so admirably harmonize. This bird I repeatedly recognized from the peculiarity of its notes during my several days' stay at this locality. Aside from such unusual variations as this, which we may consider as accidental, birds of unquestionably the same species, as the Crow, the Blue Jay, the Towhee, and others, at remote localities, as New England, Florida, Iowa, etc., often possess either general differences in their notes and song, easily recognizable, or certain notes at one of these localities never heard at the others, or an absence of some that are elsewhere familiar. This is perhaps not a strange fact, since it is now so well known that birds of the same species present certain well marked variations in size according to the latitude and elevation above the sea of the locality at which they were born, and that they vary considerably, though doubtless within a certain range, in many structural points at one and the

ORIOLE. — *Contin.*

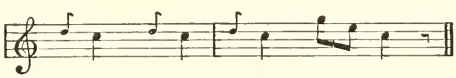
same locality. In other words, since it is known that all the different individuals of a species are not exactly alike, as though all were cast in the same die, as some naturalists appear to have believed." — **Allen, J. A.:** Notes on some of the Rarer Birds of Mass. (*Amer. Naturalist*, vol. v., December, 1869, pp. 509-510.)

"Robins, song-sparrows, and perhaps all other birds sing differently from each other, so far as I have observed; but none differ so greatly, in my opinion, as orioles. The four that I have been able to study carefully enough to reduce their song to the musical scale, though all having the same compass, arranged the notes differently in every case." — **Miller, O. T.:** Bird-ways, pp. 119-120.

"I bethink me now of two of these orioles, with whom I have been acquainted for several summers. I do not know them by their shares and plumes; I recognize them by their songs. During their sojourn here, which extends from May to October, they take up their residences within about a quarter of a mile of one another, — the one in a public park, the other in an orchard. And often have I heard the chief musician of the orchard, on the top-most bough of an ancient apple-tree, sing:



to which the chorister of the park, from the summit of a maple, would respond, in the same key: —"



Munger, C. A.: Four American Birds. (*Putnam's Mag.*, N. S. vol. iii., June, 1869, p. 726.)

SONG OF FEMALE ORIOLE.

Mr. Ingersoll remarks in "Friends Worth Knowing," that the female oriole has a "pretty song, which mingles with the brilliant tenor of the male during all the season of love-making." When the little ladies in feathers get their due it will probably be admitted that the lord and masters of no family have all the song.

ORIOLE. — *Contin.*

NOTE. — As runs one of the beautiful legends grown about the life of Saint Francis d'Assisi, the birds — to whom he preached the famous sermon and gave his blessing — did not forget him in the final hour. While he lay dying, the larks, his favorites, gathered in great numbers over his house and sang. "When his time was come, about evening, though these birds are early goers to sleep, yet they came, and with an unwonted cheerfulness, did express great joy." Our author, with a like love for the birds, associated them with important events in his life. On the night of his first marriage, when the guests had gone, and bride and bridegroom were left alone, a bird came to the window. It would not be driven away, and finally he put out his hand and took it in. But at no period of his life did the birds seem to attend him so closely as when he came to lie in the sleep too deep to be reached by their ministration. Albert Baker Cheney, his younger son, wrote from the old home in Dorset certain details which may be pardonably inserted in this connection: —

"As we were at breakfast, early the morning of starting from Franklin with the body, an oriole, the first of the season — perhaps the very same father listened to last year and took his notes — came and sang a long happy song in a tree close by the house. We spoke of it often on the sad journey. With it still in our ears, imagine our feelings when, riding into the grove in Dorset, late in the afternoon, we were greeted by similar strains. Though other birds were singing, we heard the orioles above all the rest. But the strangest part is yet to be told. The following morning, just as the body was being lowered into the ground, an oriole dashed into the top of a small tree, right in the midst of the people, and sang throughout this most silent of all times the brightest and cheeriest strains imaginable. It struck us all as very nearly realizing the voices of which father spoke so often, the music of the world beyond."

Signs from Birds.

Dr. Jenner (Roy. Soc. of London. *Phil. Trans.*, vol. cxiv. part i. pp. 11–14) notes the "beautiful propriety in the order in which singing-birds fill up the day with their pleasing harmony. The accordance between their songs, and the aspect of Nature at the successive periods of the day at which they sing, is so remarkable that we cannot but suppose it to be the result of benevolent design."

This idea, beautiful as that of Marvell in his dial of flowers, takes us as far, perhaps, as we are warranted in going; nevertheless, men have found from time immemorial an accordance reaching much wider, — have found a design, benevolent or maleficent, working through the song and flight and presence of birds at important, decisive periods of life.

See article "**Augurs**" *in* Ency. Brit., vol. iii. p. 64 (Am. ed.). — **Brand**, J.: Popular Antiquities (rev. ed., 1877), pp. 686–702. — "**Bird-Lore.**" (*All the Year Round*, N. S. vol. xx., May 11, 1878, pp. 365–370.) — **Forbes**, *Maj.* J.: Gaulama or Demon-bird. (*In his* Eleven Years in Ceylon, vol. i., London, 1840, pp. 353–354.)

Last Days of the Author.

Though biographical matter is not a part of this volume, it seems proper, for the sake of the author's many friends in New England, to add in this connection a word concerning his last days; especially since the word comes from his widow, Mrs. Julia C. Cheney, who, by reason of her intelligence and affection, rendered him great service during his life and work in Massachusetts: —

"On Thursday, May 1, my dear husband was summoned to Boston to reduce to manuscript from the phonograph some Indian songs collected by the Boston Society of Natural History. Previous visits for the same purpose had greatly interested him in the work, and he left home anticipating a day of pleasing labor. On Friday, the 2d, he returned, ill from

LAST DAYS OF THE AUTHOR. — *Contin.*

a severe cold contracted in Boston. Pneumonia was subsequently developed, and after a few days of suffering he passed peacefully away. During his half-conscious hours of illness snatches of bird-song were often upon his lips. You will find, doubtless, a sad pleasure in completing for his sake the unfinished little book which so much interested him in his last days. I have been assured that when the work on the phonograph is published Mr. Cheney's services will receive ample acknowledgment. His often expressed wish, that the close of life here might find him at work with unimpaired mental vigor, has been fulfilled. An adorer of Nature, his last labor was devoted to interpreting the songs of her children."

Notations from the Phonograph.

The following letter from Dr. Fewkes, of the Boston Society of Natural History, gives a full statement of Mr. Cheney's last service in the interpretation of Nature-music: —

"When I returned from Calais with phonographic cylinders on which were recorded the music of the Passamaquoddies, your father, who had never heard these Indians sing, wrote out from the cylinders the music, and thus made it possible for me to demonstrate that the phonograph can be profitably employed in the study of Indian melodies. In publishing the results of my experiments I have already referred to his help, and as you have shown an interest in the matter I am glad to be able to add a word or two to what I have already written.

"Some of the music of the Passamaquoddies which I obtained is undoubtedly aboriginal, and as such is very difficult to represent by our methods of musical notation. Not being a musical person myself, I left the writing out of the music to him. How well he did it others must judge; but I have every reason to believe that, as the idea of collecting Indian music by means of the phonograph was original with me, he was the first one,

NOTATIONS FROM THE PHONOGRAPH. — *Contin.*

under my direction, to write it out, and in this way to demonstrate that it could be done.

"Since these preliminary experiments, I have collected a large quantity of aboriginal music in the same way, and other musical specialists have set it to our scales, but I shall always recall with gratitude the help which he afforded me in my first experimentation. He wrote out for me three songs which were published in my 'Contribution to Passamaquoddy Folk Lore.' Although I am now of the opinion that the minute variations in the aboriginal intervals and those of Aryan music cannot be more than approximately represented in our method of writing music, I think that the work which he did for me was of very great importance." — **Fewkes,** *Dr.* J. W., in a letter to the editor dated March 21, 1891.

Variations in Bird-Song.

"The song, for example, of a thrush near London, or in any of the home counties, has little resemblance except in specific character to that of the same bird in Devonshire or near Exeter. The same notes, I suppose, will all of them be detected; but they are arranged for the most part into a different tune, and are not sung in the same way. They are given with different values, and the singing is pitched in a different key. One great distinction between the two cases is the number of guttural notes of which the song of a Devonshire thrush is often made up, but which near London are heard only at the end of a bar, or even much less frequently; while those chief notes, which mainly constitute the song of the other bird, and make it so impressive, are rarely pronounced by the Devonshire thrush." — **Jesse,** E.: Scenes and Occupations of Country Life (London, 1853), p. 112.

See Index, **Variations,** etc.

Imitation.

Mr. Allen's statement (*see* Index, Allen, J. A.), that the oriole song brought vividly to mind that of the Western meadow lark suggests the old subject of the influence of

IMITATION. — *Contin.*

imitation as a factor in the variation of bird-song. The following is a record from the author's diary : —

"I have heard wonderful singing from a caged robin that sang no strain in common with his species. His voice was stronger than the wild robin's, and his music did not lack variety. No one would surmise that it was a robin singing. He was picked up half-grown. I have also heard a robin sing in fine style a well constructed, pleasing melody that had been taught him from a musical instrument. This bird sang none of the music of his wild ancestry. His voice was superior. I believe the bird singing to be very much a matter of education or imitation ; and it is by no means certain that it has reached perfection."

The thought last expressed is one the author delighted to dwell upon. But a few hours before he sank into the final stupor he sang with great spirit the new cuckoo song (page 88) ; and among his last words were, "The birds improve."

See Index, **Improvement,** etc.

There is a valuable record on this point, now a century old : —

"I educated a young robin under a very fine nightingale, which, however, began already to be out of song, and was perfectly mute in less than a fortnight. This robin afterwards sang three parts in four nightingale; and the rest of his song was what the bird-catchers call rubbish, or no particular note whatsoever. I hung this robin nearer to the nightingale than to any other bird ; from which first experiment I conceived that the scholar would imitate the master which was at the least distance from him. From several experiments, however, which I have since tried, I find it to be very uncertain what notes the nestling will most attend to, and often

IMITATION. — *Contin.*

their song is a mixture; as in the instance which I have before stated of the sparrow. I must own, also, that I conceived from the experiment of educating the robin under a nightingale, that the scholar would fix upon the note which it first heard when taken from the nest; I imagined, likewise, that if the nightingale had been fully in song, the instruction for a fortnight would have been sufficient. I have, however, since tried the following experiment, which convinces me so much depends upon circumstances and perhaps caprice in the scholar, that no general inference or rule can be laid down with regard to either of these suppositions. I educated a nestling robin under a woodlark-linnet, which was full in song and hung very near to him for a month together; after which the robin was removed to another house, where he could only hear a skylark-linnet. The consequence was that the nestling did not sing a note of woodlark (though I afterwards hung him again just above the woodlark-linnet), but adhered entirely to the song of the skylark-linnet." — **Barrington,** D.: Roy. Soc. of London. *Philos. Trans.*, 1773, vol. lxiii. pp. 249–291.

For contrary opinion, namely that the song of birds is innate, *see* **Blackwall,** J., *in* Philos. Mag. and Journal (London), vol. lxvi., July, 1825. An extract from this paper is to be found in Amer. Jour. of Science and Arts, vol. x., Feb., 1826, pp. 390–391. — *See also* **Flagg,** W.: A Year with the Birds, p. 28. — **Nicols,** A.: Snakes, Marsupials, and Birds (London, n. d.), pp. 202–205.

For power of imitation in the bobolink, *see* **Littell's** Living Age, vol. xxix., 1851, p. 312.

For power of imitation in the crow, *see* **Cabot,** J. E.: Our Birds, and their Ways. (*Atlantic Mo.*, vol. i., December, 1857, p. 211.)

The power of imitation is certainly very commonly developed among the song-birds. An old bird-fancier (A Natural History of English Song-birds, London, 1779), shows that a round dozen of choice English songsters were known a hundred years ago as accomplished borrowers of other birds and of man.

"When I say that no living *cantatrice* can interpret this beautiful old-fashioned song [The Last Rose of Summer] with such sweetness and genuineness of expression as can the bullfinch, I am sure of stating a truth that will not be disputed by anybody who has chanced to hear them both." — **Austin, G. L.:** Friendship of Birds. (*Appleton's Journal*, N. S. vol. iii., p. 161.)

IMITATION. — *Contin.*

"[The sedge warbler] is a most remarkable species, and like the American mocking-bird, famous for his powers of imitation. It mimics the song or cry of the swallow, sparrow, thrush, lark, etc., so perfectly that you can hardly tell the difference." — **Taylor,** J. E.: Half-hours in the Green Lanes (London, 1890), p. 140.

"There is a marked distinction between the call-notes of birds, which are hereditary and invariable, and the song, which is an accomplishment, the result of effort and practice, even in those kinds which sing when free and wild. Most people who have reared a young thrush or blackbird will have noticed that as soon as the wild birds begin to sing in early spring the tame bird imitates and reproduces by degrees the same notes. The song of our canaries, which in their own country is so poor that they have been said not to sing at all, has been learned entirely from the goldfinches and linnets which have shared their cages, though the vocal organs which the canary had but did not use are so superior to those of its teachers that it has now learned to outsing them both. Among birds, as well as men, there are non-progressive races which are indifferent to 'self-improvement' and never try to learn a song of their own, much less imitate the voices of other birds or of men. But the desire to gain new notes is very much more common than most people imagine, and we believe there are at least twenty kinds which are able to reproduce even the complex forms of articulate human speech.' — *The Spectator.*

In passing, this writer, like our author, takes a more hopeful view of the art-progress of the birds than the author of the "Journal of a Naturalist": —

"From various little scraps of intelligence scattered through the sacred and ancient writings, it appears certain, as it was reasonable to conclude, that the notes now used by birds, and the voices of animals, are the same as uttered by their earliest progenitors." — **Knapp,** J. L.: Journal of a Naturalist, p. 267.

For further particulars on the point of imitation, *see* **Dom. Habits of Birds.** (*Lib. Ent. Knowl.* London, 1833, pp. 316–339.) — **Nature,** vol. xvii., 1877–78, pp. 361, 380, 438. — **Nor. Brit. Rev.** vol. xxx., 1859, pp. 325–327. — **Yarrell,** W.: Hist. of British Birds, 4th ed., vol. ii. p. 229.

Mr. W. H. Hudson gives the following description of the imitative power of a Patagonian artist, the white-banded mocking-bird (*Mimus triurus*): —

IMITATION. — *Contin.*

"While walking through a chañar-wood one bright morning, my attention was suddenly arrested by notes issuing from a thicket close by, and to which I listened in delighted astonishment, so vastly superior in melody, strength, and variety did they seem to all other bird music.

"That it was the song of a Mimus did not occur to me, for while the music came in a continuous stream, — until I marvelled that the throat of any bird could sustain so powerful and varied a song for so long a time, — it was never once degraded by the harsh cries, fantastical flights, and squealing buffooneries so frequently introduced by the 'Calandria,' but every note was in harmony and uttered with a rapidity and joyous abandon no other bird is capable of, except perhaps the skylark, while the purity of the sounds gave to the whole performance something of the ethereal rapturous character of the Lark's song when it comes to the listener from a great height in the air.

"Presently this flow of exquisite unfamiliar music ceased, while I still remained standing amongst the trees, not daring to move for fear of scaring away the strange vocalist.

"After a short interval of silence I had a fresh surprise. From the very spot whence the torrent of melody had issued burst out the shrill, confused, impetuous song of the small yellow and gray Patagonian Flycatcher (*Stigmatura albocinerea*). It irritated me to hear this familiar and trivial song after the other, and I began to fear that my entertainer had flown away unobserved; but in another moment, from the same spot, came the mellow matin-song of the Dinca Finch, and this quickly succeeded by the silvery, bell-like, thrilling song of the 'Churrinche,' or little scarlet Tyrant-bird. Then followed many other familiar notes and songs, — the flute-like evening call of the Crested Tinamou, the gay hurried twittering of the Black-headed Goldfinch, and the leisurely-uttered delicious strains of the Yellow Cardinal, — all repeated with miraculous fidelity.

IMITATION. — *Contin.*

"How much was my wonder and admiration increased by the discovery that only one sweet singer had produced all these diverse strains! The discovery was only made when he began to repeat songs of species that never visit Patagonia. I knew then that I was at last listening to the famed White Mocking-bird, just returned from his winter travels, and repeating in this southern region the notes he had acquired in sub-tropical forests a thousand miles away. These imitations at length ceased, after which the sweet vocalist resumed his own matchless song once more. I ventured then to creep a little nearer, and at length caught sight of him not fifteen yards away. I then found that the pleasure of listening to its melody was greatly enhanced when I could at the same time see the bird, so carried away with rapture does he seem while singing, so many and so beautiful are the gestures and motions with which his notes are accompanied. When I first heard this bird sing I felt convinced that no other feathered songster on the globe could compare with it, for besides the faculty of reproducing the songs of other species, which it possesses in common with the Virginian Mocking-bird, it has a song of its own, which I believe matchless: in this belief I was confirmed when, shortly after hearing it, I visited England, and found of how much less account than this Patagonian bird, which no poet has ever praised, were the sweetest of the famed melodists of the old world."

Room must be made for another of this wonderful family, one that on occasion disdains all mimicry and sings a glorious song all his own (*Mimus polyglottus, Boie*).

"It is remarkable that in those serenades and midnight solos which have obtained for the Mocking-bird the name of Nightingale, and which he commences with a rapid, stammering prelude, as if he had awaked, frightened out of sleep, he never sings his song of mimicry; his music at this time is his own. It is full of variety, with a fine compass, but less

IMITATION. — *Contin.*

mingled and more equable than by day, as if the minstrel felt that the sober-seeming of the night required a solemnity of music peculiarly its own. The night-song of the Mocking-bird, though in many of its modulations it reminds us of that of the Nightingale of Europe, has less of volume in it. There is not more variety, but a less frequent repetition of those certain notes of ecstasy, which give such a peculiar character, and such wild, intense, and all-absorbing feeling to the midnight song of the European bird. Though the more regulated quality of the song of *our* nightingale is less calculated to create surprise, it is more fitted to soothe and console; and that sensation of melancholy which is said to pervade the melody of the European minstrel is substituted in the midnight singing of our bird by one of thoughtful and tranquil delight." — **Hill, R.**: *in* Gosse, P. H., Birds of Jamaica, p. 146.

Note. — Though this bird is given as *Mimus polyglottus*, it is probably *Mimus Orpheus.*

The Nightingale and his Rivals.

In the famous old table quoted on next page, the nightingale, as usual, stands first; but as time goes on the prestige of the Sappho-Jonson "dear glad angel of the spring" seems to lessen. The claims of several rivals are presented; and though in deference to the poets and to long-established opinion, the manner of presentation is as yet noticeably deferential, it is plain and sincere. The natural, tender-hearted bird-fancier before quoted (*See* Index, Nat. Hist. of Eng. Song-birds) speaking of the woodlark says: "He is not only, as some have said, comparable to the nightingale for singing, but in my judgment, deserving to be preferred before that excellent bird." Elsewhere he draws a more detailed comparison between these songsters:

"Notwithstanding the particular fancy of divers persons for this or that bird, which they esteem and prefer to all others, the nightingale, by the generality of mankind, is still accounted the chief of all singing-birds; he sends forth his pleasant notes with so lavish a freedom, that he makes

NIGHTINGALE AND HIS RIVALS. — *Contin.*

BARRINGTON'S TABLE OF COMPARATIVE MERIT OF BRITISH SINGING-BIRDS.

(The point of perfection is 20.)

	Mellowness of Tone.	Sprightly Notes.	Plaintive Notes.	Compass.	Execution.
Nightingale	19	14	19	19	19
Skylark	4	19	4	18	18
Woodlark	18	4	17	12	8
Titlark	12	12	12	12	12
Linnet	12	16	12	16	18
Goldfinch	4	19	4	12	12
Chaffinch	4	12	4	8	8
Greenfinch	4	4	4	4	6
Hedge-sparrow	6	0	6	4	4
Aberdevine or Siskin .	2	4	0	4	4
Redpole	0	4	0	4	4
Thrush	4	4	4	4	4
Blackbird	4	4	0	2	2
Robin	6	16	12	12	12
Wren	0	12	0	4	4
Reed-sparrow	0	4	0	2	2
Blackcap, or the Norfolk Mock Nightingale .	14	12	12	14	14

NIGHTINGALE AND HIS RIVALS. — *Contin.*

even the woods to echo with his melodious voice; and this delightful bird, scorning to be out-done, will not yield to any competitor, either of birds or men. The Woodlark is his greatest antagonist, between whom there sometimes happens such a contention for mastery, each striving to outvie the other, that, like true-bred cocks, they seem resolved to die rather than lose the victory. If the former carries it in stoutness and freeness of song, so does the latter in his pleasing variety of soft, warbling, harmonious notes, in which, to my fancy, none excels or is equal to him." — **Nat. Hist. Eng. Song-birds.** London, 1779.

For an account of the singing of a mocking-bird rival kept by Dr. Golz of Berlin, *see* **Nehrling,** H.: North Amer. Birds, part i., p. 45.

NOTE. — Darwin himself must acknowledge the faculty of song in this talented family: —

"A mocking-bird (*Mimus Orpheus*), called by the inhabitants Calandria, is remarkable from possessing a song far superior to that of any other bird in the country; indeed, it is nearly the only bird in South America which I have observed to take its stand for the purpose of singing. The song may be compared to that of the sedge warbler, but is more powerful, some harsh notes and some very high ones being mingled with a pleasant warbling. It is heard only during the spring. At other times its cry is harsh and far from harmonious." — **Darwin, C.: Journal of Researches,** etc., p. 54.

Mr. Minot says: —

"I estimated that the nightingale had a most wonderful compass,[1] and was the greatest of all bird *vocalists*, but with a less individual and exquisite genius than our wood thrush." — **Minot, H. D.: Eng. birds compared with American.** (*Am. Nat.*, vol. xiv., 1880, p. 563.)

On the slopes of Olympus the song of the blue thrush is often mistaken for that of the nightingale. — **Birds of the Levant.** (*Eclectic Mag.*, N. S. vol. vii., 1868, pp. 114–119.)

And was not the song thrush the rightful recipient of Cowper's homage in his ode to the nightingale?

See Index, **Organist.**

[1] A French observer, whose name cannot now be recalled, finds that the nightingale's compass is rarely more than an octave.

NIGHTINGALE AND HIS RIVALS. — *Contin.*

For choice passages on the song of the nightingale *see* F. A. Knight's delightful little volume, "Idylls of the Field," pp. 93–94.

See also **Hamerton,** P. G.: Chapters on Animals, chap. 13. — **Dom. Habits of Birds.** (*Lib. Enter. Knowl.*, pp. 284–289.) — **Lescuyer,** F.: Langage et Chant des Oiseaux (Paris, 1878), pp. 67–71. — **Litt. Liv. Age,** vol. xxv., 1850, pp. 273–278; vol. xlii., 1854, pp. 612–614. — **Plinius Secundus,** C.: Natural History, bk. x. chap. xliii. — Die **Vogelsprache.** (*Gartenlaube*, 1866, pp. 705–707.)

"But the nightingale, another of my airy creatures, breathes such sweet, loud music out of her little instrumental throat that it might make mankind to think that miracles are not ceased. He that at midnight, when the very laborer sleeps securely, should hear, as I have often, the clear airs, the sweet descants, the natural rising and falling, the doubling and redoubling of her voice, might well be lifted above earth, and say, Lord, what music hast thou provided for the saints in Heaven, when thou affordest bad men such music on earth!" — **Walton,** I.: The Complete Angler (London, 1875), p. cxiv.

See also **Aristophanes:** The Birds. (*In his* Comedies, vol. i. pp. 301–386.)

Imported Songsters.

Thanks to the enterprise of the West, we need no longer go to the books sent us from beyond the sea to hear the old-world songsters, the birds immortalized by Keats and Shelley, the birds sung and descanted upon by hundreds of others less famous. Mr. C. F. Pfluger, Secretary of the Society for the Introduction of Useful Singing-birds into Oregon, writes under date of Dec. 22, 1890, as follows:

"In the month of May, 1889, the society imported from Clausthal, in Germany, under a contract with a German bird-dealer, the following birds in pairs of males and females, viz.: Ten pairs of black-headed nightingales, eight pairs of gray song thrushes, fifteen pairs of black song thrushes, twenty-two pairs of skylarks, four pairs of singing quail, twenty pairs of black starlings, nineteen bullfinches, three of which were females and sixteen males; the rest of the females had died on the way;

IMPORTED SONGSTERS. — *Contin.*

forty pairs of goldfinches, forty pairs of chaffinches, thirty-five pairs of linnets, forty pairs of ziskins (green finches), twenty pairs of cross-beaks, one pair of real nightingales (the rest had died on the way), and several pairs of red-breasted English robins, the European wren species, forest finches, yellow-hammers, green finches.

"When these birds arrived here, each species was put into a large wooden cage six feet high, six feet long, and four feet deep, with wire-net front, with plenty of water and their favorite food, thus giving them a good opportunity to rest and exercise their wings before they were turned loose. All these birds, with their cages, were placed on exhibition for four days to the public. Thousands of people went to see them, and the society realized about five hundred dollars by this show, which went toward paying for the expense of bringing them here. At the close of the exhibition the birds were turned loose under direction of Frank Dekum, president of the society, in the suburbs of Portland and in other counties here.

"The larks were let loose outside of the city near clover meadows.

"The birds have done well ever since they were let loose; we watched them all through the summer of 1889. Some nested in Portland and some in the suburbs, while others went far off into the State.

"We have had very flattering reports of these birds from all parts of the State.

"The birds left here in the fall of 1889 and returned in the spring of 1890, except the black thrush and the skylark; they did not migrate.

"The society has received reports from numerous places in this vicinity which show that the birds brought here and turned loose a year ago last spring, have prospered, and that the scheme has been a grand success.

. . . . . .

IMPORTED SONGSTERS. — *Contin.*

"These and other reports received by me prove that the birds are doing well, and the society is so well pleased with the success of its scheme that another subscription was started here about six weeks ago for the purpose of bringing some more of the insectivorous birds here. It is also the intention to import a number of mocking-birds from the South. The birds will arrive here about the first of March, 1891. By the introduction of such birds the orchards are protected against insects and caterpillars.

"The following is the list of useful European and South American singing-birds which the society has ordered by Mr. Stuhr, the Portland bird-dealer, to be delivered here in Portland, Oregon, in good order and condition, not later than March 1, 1891: twenty-four pairs of skylarks at $4 per pair, twenty-four pairs of American mocking-birds at $5.50 per pair, twenty-four pairs of bullfinches at $4 per pair, twelve pairs of black song thrushes at $7.50 per pair, twelve pairs of gray song thrushes at $8.50 per pair, eighteen pairs of red-breasted English robins at $5.50 per pair, twenty-four pairs of black-headed nightingales at $5.50 per pair. Some special orders for different parties were of goldfinches at $2.50 per pair, black starlings at $5.50 per pair, chaffinches at $2.50 per pair, linnets at $3.50 per pair, ziskins (green finches) $2.50 per pair.

"The aforesaid birds have to be delivered here in first-class order and healthy condition by Mr. Stuhr, the bird-dealer, and upon such delivery he will be paid for the same at the aforesaid prices.

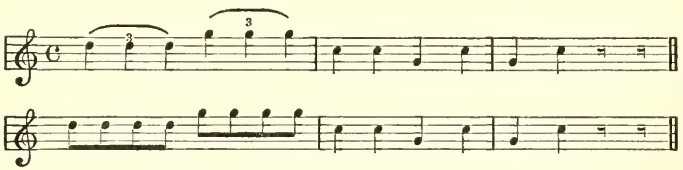
"Our first importation of birds, in 1889, has cost the society very nearly $1,500 for two hundred and seventy-five pairs, but our importation for 1891 will be considerably cheaper, owing to the fact that we have aroused the competition of the dealers."

An account of the origin of this most commendable movement is to be found in the West Shore (Portland, Oregon) for March, 1889.

Scarlet Tanager. (*See* p. 74.)

"Their more common notes are simple and brief, resembling, according to Wilson, the sound *chip-charr*. Mr. Ridgway represents them by *chip-a-ra'-ree*. This song it repeats at brief intervals and in a pensive tone, and with a singular faculty of causing it to seem to come from a greater than the real distance. Besides this it also has a more varied and musical chant, resembling the mellow notes of the Baltimore oriole. The female also utters similar notes when her nest is approached; and in their mating-season, as they move together through the branches, they both utter a low whispering warble in a tone of great sweetness and tenderness. As a whole, this bird may be regarded as a musical performer of very respectable merits." — **Baird, Brewer, and Ridgway**: North American Birds. Land-Birds, vol. i. p. 436.

Mr. Nelson and Mr. Samuels find not a little of the robin's song in that of the tanager; while Mr. A. P. Coleman, of Victoria University, Coburg, Ontario, reports him as singing at the Thousand Islands early in the summer of 1886 as follows: —



"During the three weeks that we heard him," says Mr. Coleman, "he made no other variation, except that he occasionally repeated the last two notes a third time, thus filling out the bar. The notes were taken down by a trained musician, and if whistled give the tanager's song exactly." — **Coleman, A. P.**: Music in Nature. (*Nature*, vol. xxxvi., 1887, p. 605.)

See also **Lunt, H.**: Across Lots, p. 89.

Bright Plumage *vs.* Song.

It would seem that bright plumage is not proof against bright song. It may be with the birds as it is with the

Bright Plumage *vs.* Song. — *Contin.*

flowers: while the odorous blossoms are the pale offspring of the North, the fragrant leaves and aromatic wood are found in the tropics. Henry Berthoud tells of a Bird of Paradise that he heard sing "Partant pour la Syrie."

For an account of a brilliantly colored little bird, called in St. Domingo the organist (*Pipra musica, Gmel.*), "because it sounds all the notes of the octave, rising from the bass to the treble," *see* **Buffon's** Natural Hist. (Trans. by Wm. Smellie, London, 1812), vol. xvi. pp. 346-347.

Buffon believes this to be the same bird described under the name "bishop" in Dupratz's Hist. of Louisiana: —

"Its notes are so flexible, its warble so tender, that when we once hear it, we become more reserved in our eulogiums on the nightingale. Its song lasts during a *Miserere*, and during the whole time it never makes an inspiration; it rests twice as long before it renews its music, the whole interval elapsed being about two hours."

Organ-Bird.

The trustworthy observer, Mr. Bates, writes of a songster of the Amazonian forest, called also the organ-bird, or realejho (*Cyphorhinus cantans*): —

"When its singular notes strike the ear for the first time the impression cannot be resisted that they are produced by a human voice. Some musical boy must be gathering fruits in the thickets, and is singing a few notes just to cheer himself. The tones become more fluty and plaintive, — they are now those of a flageolet; and notwithstanding the utter impossibility of the thing, one is for the moment convinced that some one is playing that instrument. . . . . It is the only songster which makes an impression on the natives, who sometimes rest their paddles whilst travel-

ORGAN-BIRD. — *Contin.*

ling in their small canoes along the shady by-paths, as if struck by the mysterious sound." — **Hudson**, W. H.: South American Bird-music. (*Nature*, vol. xxxiii. pp. 199-201.)

Solitaire. (*Musicapa armillata, Viellot.*)

Mr. Hill thought Buffon's "organist" the same as the solitaire. Gosse corrects him on page 202, "Birds of Jamaica." This error admitted, the naturalist of Spanish Town has put us greatly in his debt by a description of a master singer in Hayti: —

"As soon as the first indications of daylight are perceived, even while the mists hang over the forests, these minstrels are heard pouring forth their wild notes in a concert of many voices, sweet and lengthened like those of the harmonica or musical glasses. It is the sweetest, the most solemn and most unearthly of all the woodland singing I have ever heard. The lofty locality, the cloud-capped heights, to which alone the eagle soars in other countries, — so different from ordinary singing-birds in gardens and cultivated fields, — combine with the solemnity of the music to excite something like devotional associations. The notes are uttered slowly and distinctly, with a strangely-measured exactness. Though it is seldom that the bird is seen, it can scarcely be said to be solitary, since it rarely sings alone, but in harmony or concert with some half-dozen others chanting in the same glen. Occasionally it strikes out into such an adventitious combination of notes as to form a perfect tune. The time of enunciating a single note is that of the semibreve. The quaver is executed with the most perfect trill. It regards the major and minor cadences, and observes the harmony of counterpoint, with all the preciseness of a perfect musician. Its melodies, from the length and distinctness of each note, are more hymns than songs. Though the concert of singers will keep to the same melody for an hour, each little coterie of birds chants a different song, and the traveller by no accident ever hears the same tune." — **Hill**, R.: *in* Gosse, P. H., Birds of Jamaica, pp. 201-202.

See Index, **Johnston**, A. G.

Rose-breasted Grosbeak. (*See* p. 76.)

"It is a very fine songster, and is hardly excelled by any of our other species, — its notes being uttered, not only through the day, but also during the night, as I have heard on several occasions. The song is difficult of description; it is a sweet warble, with various emphatic passages, and sometimes a plaintive strain, exceedingly tender and affecting." — **Samuels**, E. A.: Our Northern and Eastern Birds, p. 330.

"He is not always silent during the day, when feeding, but it is at evening in May or June that he sings most loudly and sweetly. Then, perching near the top of some low tree, he pours out an extremely mellow warble, like that of the Robin, but very much finer. Sometimes in the love-season he sings at night, and with an ardor which adds to the beauty of his song." — **Minot**, H. D: Land-birds and Game-birds of N. E , p. 234.

"It thrives very well in a cage, is a most melodious and indefatigable warbler, frequently in fine weather, as in its state of freedom, passing a great part of the night in singing, with all the varied and touching tones of the nightingale. While thus earnestly engaged, it seems to mount on tiptoe in an ecstasy of enthusiasm and delight at the unrivalled harmony of its own voice. The notes are wholly warbled, now loud, clear, and vaulting with a querulous air, then perhaps sprightly, and finally lower, tender, and pathetic. In short, I am not acquainted with any of our birds superior in song to the present, with the solitary exception of our Orphean Mocking-bird." — **Nuttall**, T.: Manual of Ornithology, p. 623.

See also **Lunt**, H.: Across Lots, p. 109.

Mr. Burroughs thinks that this performer has "fine talents, but not genius" (*in his* Wake-robin, pp. 67–68).

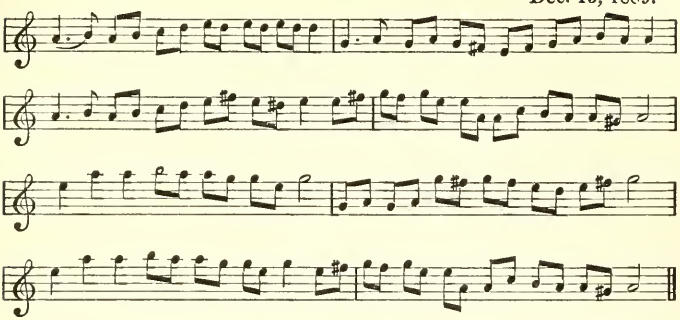
The Author's Power of Memory. (*See* p. 76).

The author's tenacious memory of both sound and sight is illustrated by the following notation of an old melody and by an extract from a letter dated January, 1888.

"Learned this at sixteen as John Foss whistled it in smooth full tones when we were making horseshoes, evenings. This was while the irons were heating.

THE AUTHOR'S POWER OF MEMORY. — *Contin.*

Dec. 15, 1889.



"I have had three wonderful horses, all small, — Old Pink, Old Dresser Mare, and Lightfoot. I have written them up. Have a photograph of Dresser and Lightfoot; and can from memory dictate a good picture of old Pink. Dear me! I have omitted 'Flying Jennie,' the 'most grandest' of all, of whom you know little. I have her also photographed in my eye, and shall have while I dwell 'here below.' These four animals were not surpassed for rare qualities by any that I have known of. Each was a wonder. Old Dresser was fifteen years old before she was harnessed. You remember her at *forty*. Think of that!"

Red-eyed Vireo. (*See* p. 78.)

"Their song consists of a few notes, which are warbled again and again with little intermission or variety (and which are *sometimes* interrupted now and then by a low whistle). This music would be monotonous were it not for its wonderful cheerfulness, energy, and animation, in these qualities resembling the Robin's song. The 'Red-eyes' have also a *chip*, a chatter like a miniature of the Oriole's scold (and to be heard in the season of courtship), and a peculiarly characteristic querulous note, which, like others, cannot be described accurately; whence the advantage

RED-EYED VIREO. — *Contin.*

of studying birds through Nature, and not through books.— **Minot, H. D.**: Land-birds and Game-birds of N. E., p. 157.

"It is a most persistent and tireless songster, whose earnest melody enlivens the sultry noon and the drowsy, listless after-hours of mid-summer days, which prove too much for the spirit of unwilling school-boys, but seem to have no depressing effect upon this indefatigable musician." — **Stearns, W. A.**: N. E. Bird-life, p. 196.

"Everywhere in these States, at all hours of the day, from early dawn until evening twilight, his sweet, half-plaintive, half-meditative carol is heard. I know that I am not singular in my preference when I say that of all my feathered acquaintances, this is the greatest favorite I have." — **Samuels, E. A.**: Our Northern and Eastern Birds, p. 271.

"In moist and dark summer weather, his voice seems to be one continued, untiring warble of exquisite sweetness; and in the most populous and noisy streets of Boston, his shrill and tender lay is commonly heard from the tall elms." — **Nuttall, T.**: Manual of Ornithology, p. 354.

See also **Lunt, H.**: Across Lots, p. 116.

Energy expended in Bird-Song.

The energy expended in the day-long singing of the vireo is a source of continuous wonderment. The Rev. J. G. Wood, a man well fitted to speak of indefatigable effort, has a passage on that prodigy of song, the English lark: —

"The lark ascends until it looks no larger than a midge, and can with difficulty be seen by the unaided eye, and yet every note will be clearly audible to persons who are fully half a mile from the nest over which the bird utters its song. Moreover, it never ceases to sing for a moment, a feat which seems wonderful to us human beings, who find that a song of six or seven minutes in length, though interspersed with rests and pauses, is more than trying. Even a practised public speaker, though he can pause at the end of each sentence, finds the applause of the audience a very welcome relief. Moreover, the singer and speaker need to use no exertion save exercising their voices. *Yet the bird will pour out a continuous song of nearly twenty minutes in length*, and all the time has to support itself in the air by the constant use of its wings." — **Wood,** *Rev.* J. G.

Yellow-breasted Chat.

"As soon as our bird has chosen his retreat, which is commonly in some thorny or viny thicket, where he can obtain concealment, he becomes jealous of his assumed rights, and resents the least intrusion, scolding all who approach in a variety of odd and uncouth tones, very difficult to describe or imitate, except by a whistling, in which case the bird may be made to approach, but seldom within sight. His responses on such occasions are constant and rapid, expressive of anger and anxiety; and still unseen, his voice shifts from place to place amidst the thicket, like the haunting of a fairy. Some of these notes resemble the whistling of the wings of a flying duck, at first loud and rapid, then sinking till they seem to end in single notes. A succession of other tones are now heard, some like the barking of young puppies, with a variety of hollow, guttural, uncommon sounds, frequently repeated, and terminated occasionally by something like the mewing of a cat, but hoarser, — a tone to which all our vireos, particularly the young, have frequent recurrence. All these notes are uttered with vehemence, and with such strange and various modulations as to appear near or distant, like the manœuvres of ventriloquism.[1] In mild weather also, when the moon shines, this gabbling, with exuberance of life and emotion, is heard nearly throughout the night, as if the performer were disputing with the echoes of his own voice." — **Nuttall, T.**: Manual of Ornithology, p. 340.

Bobolink. (*See* p. 82.)

"Have tried on the bobolink. Found him, as I anticipated, impossible to copy fully, but I can make out his pitch,[2] and some of his notes. One must be very quick to decide on the intervals in a bird-song; I have much improved in it, and I was tolerably apt when I took 'em

[1] *See* Index, **Ventriloquism.**

[2] Mr. Cheney took the pitch with a little reed instrument made for the purpose. It is about five inches long and two inches wide. The tones are, —

Bobolink. — *Contin.*

up. But bobolink is too much for me. He is a stent. My grandfather used to say he sang, —

"'Queer, queer, ker chube
Ker dingle-dongle swingle
Serangle kalamy kalamy
Whoa boys, whoa boys
Wicklemerlick wicklemerlick steeple
Steeple stoot steere
Queer queer temp, temp!'"

C., S. P. in a letter dated October, 1886.

Ingenious as Grandsire Cheney was, he has been outdone by, or at least in the name of, some colored brother of a later generation: —

"Liberty, liberty,
Berry nice to be free!
Bob-o-link where he please,
Fly in de apple-trees;
Oh 't is de freedom note
Guggle sweet in him troat.
Jink-a-link, jink-a-jink,
Winky wink, winky wink,
Only tink, only tink,
How happy, Bob-o-link!
Sweet! Sweet!"

Lost Hunter, pub. by Derby and Jackson, 1855?

This *tour de force* in onomatopœia goes far toward redeeming the many failures with which one instantly contrasts it. We may doubt that the song thrush (*Turdus musicus*) carols, "My dear, my pretty dear, my pretty little dear;" we can hardly credit the Moslem that the curlew sings over and over "Lak, lak, lak! la Kharya Kalak fih

BOBOLINK. — *Contin.*

il mulk" (God alone is king, etc.); we may absolutely refuse to listen to Bechstein's dreadful *zozozos* and *tsissisis* and *kigaigais* saddled on the *prima donna* of all the choirs of air, — but this simple "Liberty, liberty" song, together with certain happy syllables of Emerson and a very few others, may well be allowed to stand.

"Mounting and hovering on wing at a small height above the field, he chants out such a jingling medley of short, variable notes, uttered with such seeming confusion and rapidity, and continued for a considerable time, that it appears as if half a dozen birds of different kinds were all singing together. Some idea may be formed of this song by striking the high keys of a pianoforte at random singly and quickly, making as many sudden contrasts of high and low notes as possible. Many of the tones are in themselves charming; but they succeed each other so rapidly that the ear can hardly separate them. Nevertheless, the general effect is good; and when ten or twelve are all singing on the same tree, the concert[1] is singularly pleasing." — **Wilson,** A.: Amer. Ornithology, vol. ii. (Phil. 1810), p. 50

"[The sky-lark's song is] not very musical, not so rich as our bobolink's roundelay." — **Minot,** H. D.: *in* Am. Nat., vol. xiv., 1880, p. 563.

(Macgillivray says, "The song of the lark is certainly not musical.")

For a bobolink in the *rôle* of a canary, *see* **Litt. Liv. Age,** vol. xxix., 1851, p. 312.

[1] "The bobolinks are very numerous around my home in Caledonia County, Vt., and I once heard there what seemed to me a very remarkable bobolink concert. There are two butternut-trees growing in the corner of our garden, and my attention was attracted one day by an unusual chattering from that quarter. Upon going near, I saw that the trees were filled with bobolinks, every one of which was singing as loud as he could sing. After a short time, one of their number flew away, and to my surprise, every bird stopped singing. Soon they all began again, not together, but one at a time. The first to begin sang the liquid opening notes alone, and just as he started in with the rollicking song that follows, a second struck in with the same sweet first notes, then a third struck in at the same point in *his* song; and so it went on, until they were all singing again, and under all the rollicking chatter vibrated the tender undertone of the liquid notes that begin their song. I watched

Yellow-billed Cuckoo. (*See* p. 89.)

"The notes of the Yellow-billed Cuckoo do not differ distinctly from those of the Black-billed species, though often harsher.

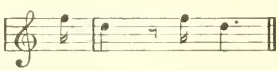
. . . . . .

"The notes of the Cuckoo are all unmusical, and more or less uncouth and guttural. They are much varied, being sometimes *cow-cow-cow-cow-cow, cow-cow*, sometimes *cuckoo'-cuckoo'-cuckoo'*, sometimes *cuckucow'*, *cuckucow'*, and at other times low. Many of them are very liquid, but I have heard one cry which has an affinity to that of certain Woodpeckers. The Cuckoo may sometimes be heard at night." — **Minot, H. D.:** Land-birds and Game-birds of N. E., pp. 309-310.

Cuckoo. (*See* p. 87.)

Mr. Mitford is quoted as saying of the English cuckoo that it begins to sing "early in the season with the interval of a minor third; the bird then proceeds to a major third, next to a fourth, then to a fifth, after which his voice breaks without attaining a minor sixth." — **Domestic Habits of Birds.** (*Lib. Enter. Knowl.*, p. 305.)

The writer then goes on to say that the "usual note of the cuckoo is the minor third, sung downwards, thus:"

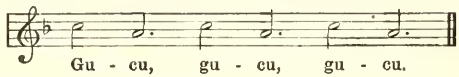


---

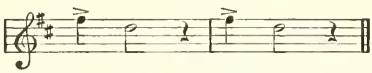
and listened as long as the concert lasted, and whenever one of the performers flew away, which occurred several times, they were all silent for the space of perhaps half a minute, when they would start in again. Plainly they had a method, and probably a leader. I am quite sure that no two started in together, as even after so many were singing that I could not trace each voice as it began, the number of voices steadily increased till the whole choir was singing again. I cannot give the date, but it may have been as early as 1882, and must have been in June, as that is the bobolinks' merriest month. Although I had never missed a June among the bobolinks, this was the first time I had heard a bobolink concert. I heard a like performance a few, perhaps three, times afterwards, but never so many performers; nor did I ever again hear them sing so long a time. I think I never heard them sing in this way twice in the same year, and never anywhere but in those same butternut-trees. No one to whom I have mentioned this performance has heard anything of the kind." — **Hayward,** *Miss* **C. A., in a note to the Editor dated August, 1891.**

Cuckoo. — *Contin.*

Father Kircher gives it (Musurgia, bk. i. p. 30) as follows: —



Gardiner puts it in the major: —



See Index, **Cuckoo.**

For intervals of English cuckoo song *see* **Nature,** vol. xxii., 1880, pp. 76, 97, 122; vol. xxxvi., 1887, p. 344.

For manner in delivery *see* **Knight,** F. A.: By Leafy Ways, p. 18.

Bell-Bird.

The cuckoo has a delightful rival in distinctness of utterance, one of the gayly-colored cotingas inhabiting the mountains of Demerara: —

"The fifth species is the celebrated Campanero of the Spaniards, called Dara by the Indians, and Bell-bird by the English. He is about the size of the jay. His plumage is white as snow. On his forehead rises a spiral tube nearly three inches long. It is jet black, dotted all over with small white feathers. It has a communication with the palate, and when filled with air, looks like a spire; when empty it becomes pendulous. His note is loud and clear, like the sound of a bell, and may be heard at the distance of three miles. In the midst of these extensive wilds, generally on the dried top of an aged mora, almost out of gun reach, you will see the campanero. No sound or song from any of the winged inhabitants of the forest, not even the clearly pronounced 'Whip-poor-Will' from the goat-sucker, causes such astonishment as the toll of the campanero. With many of the feathered race, he pays the common tribute of a morning and an evening song; and even when the meridian sun has shut in silence the mouths of almost the whole of animated Nature, the campanero still cheers the forest. You hear his toll, and then a pause for a minute, then another

BELL-BIRD. — *Contin.*

toll, and then a pause again, and then a toll, and again a pause. Then he is silent for six or eight minutes, and then another toll, and so on.

"Acteon would stop in mid chase, Maria would defer her evening song, and Orpheus himself would drop his lute to listen to him, so sweet, so novel and romantic is the toll of the pretty snow-white campanero. He is never seen to feed with the other cotingas, nor is it known in what part of Guiana he makes his nest." — **Waterton, C.**: Wanderings in South America (London, 1879), p. 180–181.

See also **Funk, N**: Glockengeläute im Walde. (*Gartenlaube*, 1875, pp. 527–530.) — **Gosse, P. H**: Romance of Nat. Hist. pp. 21–22.

Ruffed Grouse. (*See* p. 92.)

"Audubon supports me on the night-hawk booming; but says the partridge drums on his breast. I am alone on this point." — **C., S. P.**, in a letter dated February, 1888.

It is not strange that our author believed himself alone on this point. A fact it is that the great names, with hardly an exception, are ranged against him. Darwin quotes only the old orthodox "body" and "log" reporters. Dr. Coues, however, comes to a contrary conclusion.

"Early in spring, the male begins 'drumming'; this habit is peculiar to this species, and is probably familiar to all persons who have passed much of their time in the woods.

"I have heard this drumming as early as February, and as late as September; but usually it is not heard much before the first of April. The bird resorts to a fallen trunk of a tree or log, and while strutting like the male turkey, beats his wings against his sides and the log with considerable force.

"This produces a hollow drumming noise that may be heard to a considerable distance; it commences very slowly, and after a few strokes, gradually increases in velocity, and terminates with a rolling beat very similar to the roll of a drum.

"I know not by what law of acoustics, but this drumming is peculiar in sounding equally as loud at a considerable distance off as within a few

RUFFED GROUSE. — *Contin.*

rods. I have searched for the bird when I have heard the drumming, and while supposing him to be at a considerable distance, have flushed him within the distance of fifty feet, and *vice versa*." — **Samuels, E. A.** : Our Northern and Eastern Birds, pp. 386–387.

"In the spring and early summer may be heard that remarkable sound called 'drumming.' Whoever is fortunate enough to approach closely an old cock in the act of drumming, will be well rewarded for the trouble that he may have taken in so doing. Generally on a log or broad stump or in a cleared spot, the bird will be seen, puffed like a turkey to twice his natural size, with his crest erect, his ruffs extended, and his tail spread, strutting about, lowering or twisting his neck and head, and then suddenly beating violently with his wings his inflated body. This causes a sound which on a favorable day may be heard for a mile or two, and which is often repeated at intervals for some time. One can appreciate the muscular vitality of the wings and the rapidity of their motion, by endeavoring to imitate the sound on a cushion (or other surface) with the hand. It will be found impossible to equal or even to approach the rapidity of the repeated strokes." — **Minot, H. D.**: Land-birds and Game-birds of N. E., p. 390.

"Most writers follow Audubon and Nuttall in saying that the drumming is produced by striking the wings against the body; but from the accounts given me by reliable sportsmen, there is no doubt that the above high authorities are in error. Wilson does not say that the wings are struck against the body, though it is somewhat uncertain whether he meant to say so or not, since the rest of his description is substantially that of Audubon and Nuttall.

"My esteemed friend, Mr. H. W. Henshaw, of Cambridge, Mass., has furnished me with what I believe to be a reliable account of the manner in which the drumming is produced. His authorities are his father and Mr. William Brewster, of Cambridge, — the latter an accomplished sportsman, whose statements I can vouch for myself. Mr. Henshaw describes the drumming process as follows: —

"'The bird sits crosswise upon the log, resting upon the back of the tarsi (not standing erect as described by some writers), its tail projecting nearly horizontally behind (not erected) and spread; the head is drawn back, the feathers pressed close to the body. The wings are then raised and stiffened, and drumming commences by a slow, hard stroke with both wings, downward and forward; but they are stopped before they touch the body. The rapidity of this motion is increased after the first few beats, when the wings move so fast that only a semi-circular haze over the bird is visible;

RUFFED GROUSE. — *Contin.*

this rapid vibration causing the rolling noise with which the sound terminates. The movements of the wings, and the rumbling thereby produced, are entirely analogous to those produced by the humming-bird, when hovering over a flower. This I believe to be the true description of the *manner* of drumming, and I am happy to add that my father, who has often crawled up to within twenty feet of the bird at such times, corroborates it in every particular. There are, doubtless, among those who read the 'Sportsman,' many who have had opportunities to watch the operations of the ruffed grouse when engaged in drumming, and the experience of each one would be a very acceptable contribution to our knowledge of the habits of this very interesting species.

"'The fact that the drumming of the ruffed grouse is heard as often in autumn as in spring has raised the question of *why* this sound is produced. In regard to this, Nuttall is probably correct in saying that it is often 'an instinctive expression of hilarity and vigor,' as well as the call-note of the male during the breeding season.'

"To this article Mr. J. H. Batty replies in the following terms: —

"'In No. 21 of the 'Sportsman' I find an article of my friend, Mr. Ridgway, 'Why and how does the ruffed grouse drum?' I solved the mystery, to my own satisfaction, some five years ago, when living at Springfield, Mass. The peculiar noise made by the ruffed grouse is caused by the backs or exterior sides of the wings *striking each other* as they are forcibly raised over the back of the bird. I have seen the grouse drum, within a few yards of me, a number of times. On one occasion I was sitting on a log in the woods, by a stone wall, eating my lunch. While thus engaged, a ruffed grouse mounted the wall, about fifty yards from my position, and commenced walking on it directly toward me. I immediately lay down behind the log on which I had been sitting, and awaited the approach of the bird. When it had reached a point opposite me it mounted a large elevated stone on the top of the wall and commenced drumming, after a series of struttings backward and forward on the wall, as described by Audubon, Wilson, and others. When the bird was drumming, its back was toward me, and I had an unobstructed view of it against the sky. The grouse first struck its wings together slowly and strongly, then gradually increased these strokes until the single strokes could not be detected. During the more rapid beating of the wings the 'semi-circular haze' caused by the wings was observable, as stated by Mr. Henshaw. The wings of the grouse were stiffened, and the strokes given from the shoulder (if I may so speak); and the wings did not appear to touch the bird's sides.

RUFFED GROUSE. — *Contin.*

"'This occurred in October. Later in the season, when going the round of my mink and musk-rat traps, I found a male ruffed grouse caught in one of them by the leg. The bird had evidently been caught but a short time before my arrival; and as the trap which held it was a small and weak one, and the jaws were filled with leaves, the bird's leg had not been broken. I carried the grouse home and put it in a large feed-box which was standing in the open air under the shade of an apple-tree. When returning from a hunting excursion, one day, one of my neighbors said, 'Your partridge has been drumming.' I put an old stump in the box of my captive, and it had the desired results, for the next morning it was drumming loudly. I observed its motions when drumming, through a hole in the box, and I am confident that the noise was caused by the wings coming forcibly in contact with each other. Let any person take the wings of a dead grouse in his hands and beat them quickly together over the bird's back, and it will be seen at once that the peculiar sound made by the ruffed grouse, and called drumming, is naturally produced. The 'young-of-the-year' of the male grouse drum in the autumn more frequently than the adult males, as I have ascertained by shooting them when in the act. I have found great difficulty in stalking the grouse at their drumming-posts, and have often failed in my attempt to do it. The male birds fight hard battles in the spring, and I once caught an old cock by the legs in a snare, that had its head cut and bruised very badly, and portions of its neck almost destitute of feathers, the effects of fighting.'" — **Ridgway, R.**, *in* American Sportsman (*quoted by* Coues, *Dr.* E., *in his* Birds of the North-west, pp. 422–425).

"I have myself never witnessed the act; but my present view is that the noise is made by beating the air simply, — not by striking the wings either together or against the body or any hard object." — **Coues, *Dr.* E.:** Birds of the North-west, p. 425.

Finally, Mr. Torrey, who, after repeated observations, declines to say how the "drumming" is done, records a most amusing decision: —

"A man who is a far better ornithologist than I, and who has witnessed the performance under altogether more favorable conditions than I was ever afforded, assures me that his performer *sat down!*" — **Torrey, B.: A Rambler's Lease**, p. 221.

Loon. (*See* p. 95.)

Note: "Celia Thaxter says, 'Loons seem to me the most human and at the same time the most demoniac of their kind. . . . Their long, wild, melancholy cry before a storm is the most awful note I have ever heard from a bird. It is so sad, so hopeless, — a shudder of sound.'" — C., S. P.

There can be no doubt that the loon flies under water, as does the murre or guillemot, a bird of the same family as the auk.

"I have just read your article in the November 'Century' on the loon, and venture to write to confirm your supposition that the loon does use its wings under water. I was born in Harrison, Cumberland County, Maine, at the head of Long Lake; and one bright summer morning I was standing on the top of the cabin of a canal-boat that was being slowly 'poled' along the shore of the lake where the water was some ten feet deep with a sandy bottom. The lake was calm and the water very clear. A loon that was swimming some distance from the boat dove, and in a moment I saw him passing within about twenty feet of the boat and about three feet under water. His wings were in rapid motion, the same as if in the air; and he moved very swiftly. For the first time I was able to understand how they could go so far under water in so short a time. This was thirty-five years ago, and I was about fifteen years old. I have never met any one else who has seen a loon fly under water. My eyesight was remarkably good at the time, and I am sure I could not have been mistaken." — **Blake,** Grinfill, in a letter to the author, dated February, 1888 (New Brunswick, N. J.).

See under Loon, **White,** *Rev.* G.: Nat. Hist. of Selborne.

Great Horned Owl. — Harmony. (*See* p. 98.)

"Did you ever hear harmony produced by bird-notes? Thanksgiving I took a horseback trip to Mount Diablo. As I lay awake in camp, towards morning a great horned owl began to hoot in its deep and not unmusical tones, *hoo-hoo, hoo-to-hoo.* Soon another began to call hard by, but not on the same tone; there was one tone between them. The most singular effect was produced when the two birds hooted together, as they did several times. It was a perfect chord of the third." — **Keeler, C. A.,** in a note dated Dec. 16, 1890.

Screech-Owl. (*See* p. 100.)

Mr. Lowell, whose wont it is to see and hear the thing commonly overlooked, regards the cry of this owl as "one of the sweetest sounds in Nature."

Hen Music and Talk. (*See* p. 104.)

"As an example of bird language Mr. C. F. Holder says in 'Wide Awake' that the ordinary domestic fowl presents the most interesting and perfect songs. Half an hour in a barnyard will demonstrate that certain sounds are the equivalent of words. The crow of the cock is a challenge to another cock, and is not noticed by the hens; but let him find a delicate morsel and he stops crowing to utter a succession of short notes: 'Tuck, tuck, tuck, tuck!' at which the hens gather about him for their share of the dainty.

"The different notes, or 'baby-talk,' of the mother hen are of great variety, and mean quite different things. Every biddy understands that 'chuck, chuck, chuck!' means 'Come home to your mother,' just as the quick call, 'tuck, tuck, tuck!' means 'come to your supper.' Mr. Holder gives the following brief chapter of domestic fowl language from a dictionary too extended to present in unabridged form:—

'Ur-ka-do-dle-do-o-o. Challenge of male.
Tuck, tuck, tuck. Food call.
K-a-r-r-e. Announcing presence of hawk.
Cut, cut, ca-da-cut. Announcement of egg-laying.
Cluck, cluck, cluck. Call of young.
Kerr, kerr, kerr. Song of contentment of hen.
C-r-a-w-z-z-e. Quieting young chicks.
W-h-o-o-i-e (whistle). Expression of apprehension at night.
C-r-a-i-a-i-o-u. Terror and protest at capture.'"

Newspaper clipping.

VARIOUS NOTATIONS

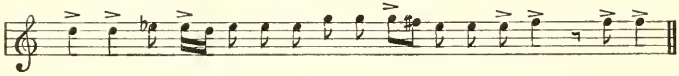
OF

THE MUSIC OF NATURE.

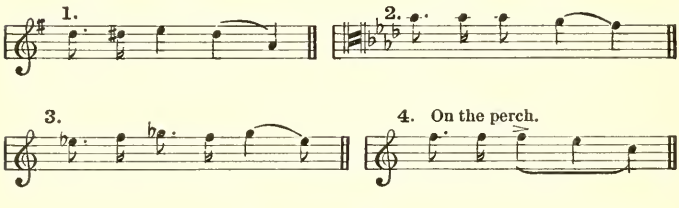
GROUPED ACCORDING TO THE SOURCE.

FROM THE AUTHOR'S DIARY.

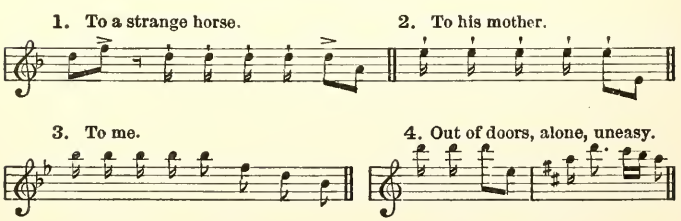
CROW.



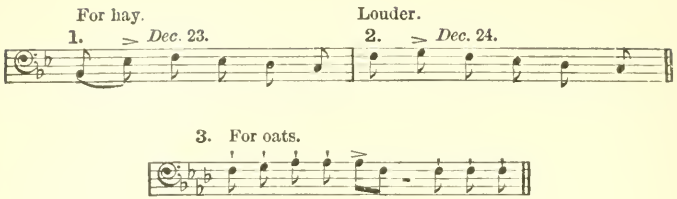
ROOSTERS.



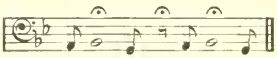
COLT.



MARE.



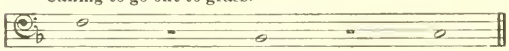
TWO-YEAR-OLD BULL.



Boh-oo wah, boh-oo wah.

YOUNG COW.

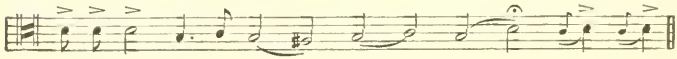
Calling to go out to grass.



Bwa, bwa, bwa.

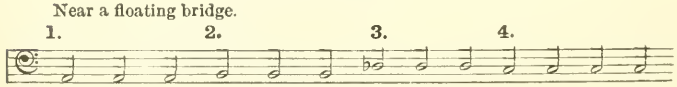
DOG.

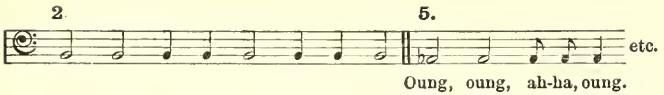
Howling at the blowing of whistles. Lynn, *January*, 1888.



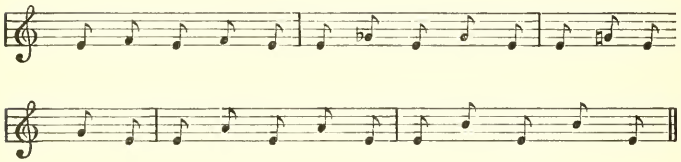
BULL-FROGS.

Near a floating bridge.





Made close observations this morning on Tim's purring. I find that he varies the intervals. Have now heard him in a perfect fifth. He ranges, then, from one to five of the scale.

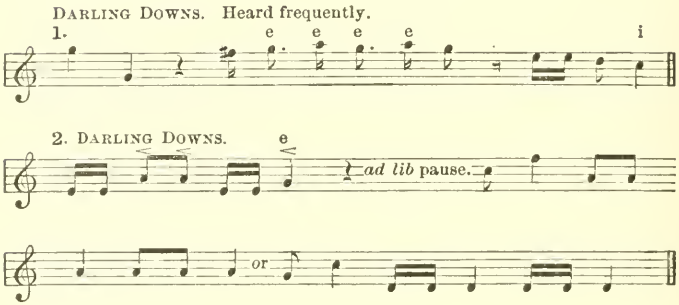


The rhythm also is varied; there is a *crescendo* and *ritardando* as well, and the dynamics are good. So far the higher tone is always given with the inhaling.

D. H. BECKLER.

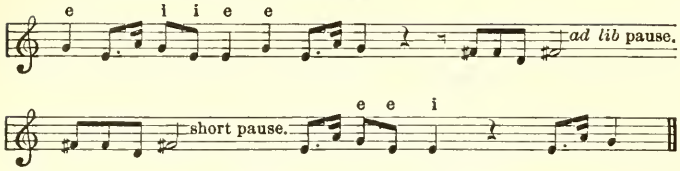
(Music of the Birds, in "Die Gartenlaube" for 1867, pp., 558–559.[1])

(Names of the birds are not given, simply the localities where the songs were taken).



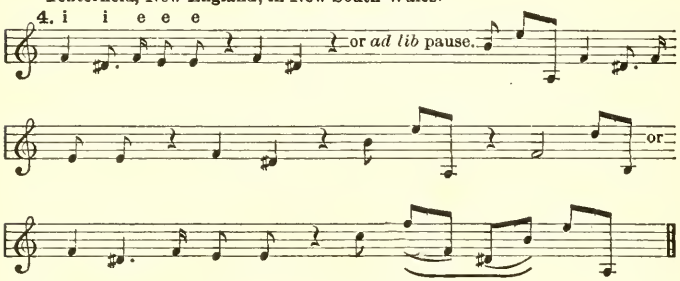
[1] There is something about the very look of these notes, from the pen of a German traveller in Australia, that leads one to believe in their accuracy. This reporter, if no ornithologist (*kein Zoologe*) is indisputably a musician. Unable, in many instances, to so much as catch a glimpse of the singer, to say nothing of learning his name, he is concerned solely with the voices he heard. Intent on correcting a prevalent impression in Europe that the sweet bird-songs and the fragrant flowers flourish there as nowhere else, he comes to the gist of the matter at once: The grandest concerts of feathered singers (*die grossartigsten Concerte von gefiederten Sängern*) are to be heard in the clime from which he writes. From this he goes on to say, in substance, that, while the patient observer can translate the lovely twittering (*liebliche Gezwitscher*) of the birds of Germany into words or syllables, he can, with the requisite musical knowledge, bring the melodies of the Australian songsters (*die Melodieen der luftigen Sänger Australiens*) into our note-system with the nicest differences of tone and the most exact reproduction of the rhythmic movement

3. Hastings River, New South Wales.

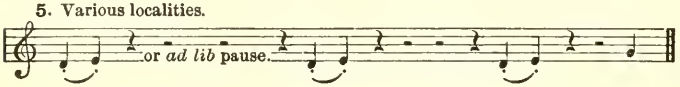


Tenterfield, New England, in New South Wales.

4. i i e e e



5. Various localities.

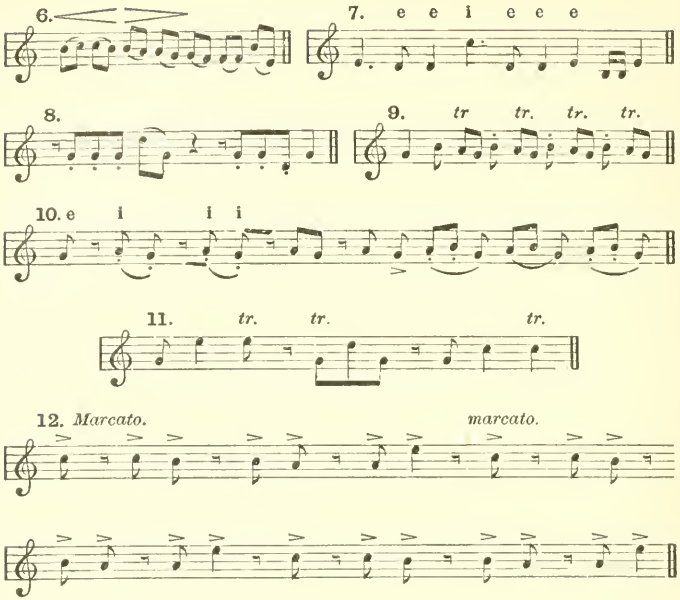


(*biz zum feinsten Unterschied der Töne und mit der genauesten Wiedergabe der rhythmischen Bewegung*).

He says that he wrote his brother that the German birds, in comparison with the Australian singers, were mere bunglers (*Stümper*), and adds that he did not have occasion to alter his opinion later on. Three times he mentions the point of rhythm. The litany of the owls is intoned in exact rhythm (*im strengsten Rhythmus*). This paper, meritorious as it is isolated in the annals of the most musical of nations, is heartily commended to all readers, especially to those that question whether "the little bird-songs are melodies, are music."

The songs from one to eleven are those of various unknown songsters. Number three is reported as exceptional in its sweetness and tenderness (*Lieblichkeit und Zartheit*), and is sung in strict rhythm, each tone being delivered with singular precision. The letters *e* and *i*, over the notes, indicate the breathing, — exhaling and inhaling.

Number twelve is the song of a bird the colonists call the "soldier" or "leather-head," and is described as containing in itself a world of melan-



choly (*eine Welt von Melancholie*). One can easily imagine the spell cast by this woful, distinctly marked ditty struck up in the stillness of night.

See "Gartenlaube," 1867, pp. 558–9.

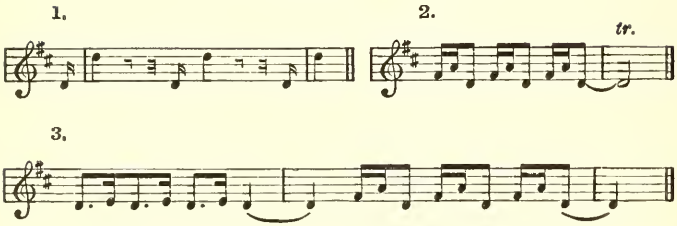
"For beauty and striking contrasts of plumage, the birds of Australia are unrivalled, and the idea that they have no note or song is without foundation. In the Australian Bush, what is more pleasant than to listen in the early morning to the flute-like notes of the piping Crow-shrike (*Gymnorhina tibicen*), and the rich and varied natural notes of the Lyre-bird (*Menura superba*), far excelling those of the Song-thrush, and having immense powers of mimicry and ventriloquism. This power of ventriloquism is also possessed by the Atrichias, and the Oreoica, while the cheerful notes of the Robins, Fly-catchers, and many others of the smaller birds testify to the fact that our birds have both a pleasing note and varied song."

Guide to the Contents of the Australian Museum (Sydney, 1890), p. 55.

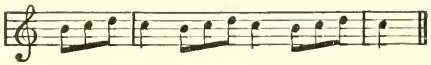
WILLIAM GARDINER.

(In "The Music of Nature.")

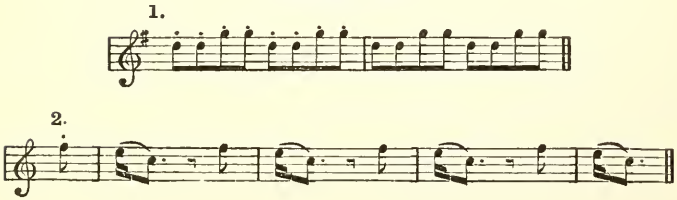
NIGHTINGALE.



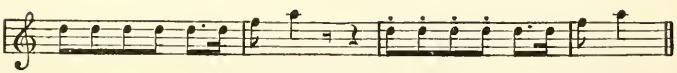
THROSTLE.



BLACKBIRD.

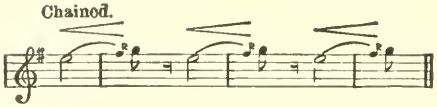


HEN.



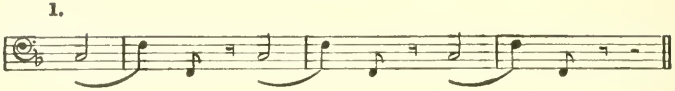
DOG.

Chainod.

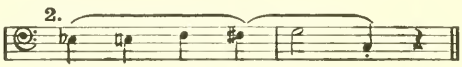


OX.

1.



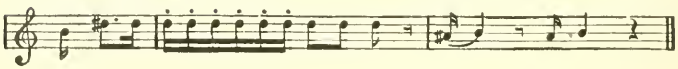
2.



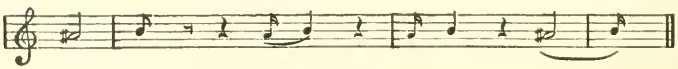
HORSE.

FOWLS.

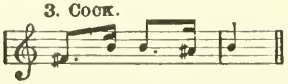
1. In the morning.



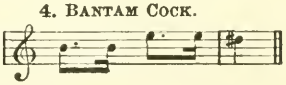
2. In the evening.



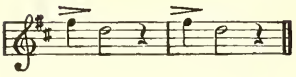
3. Cock.



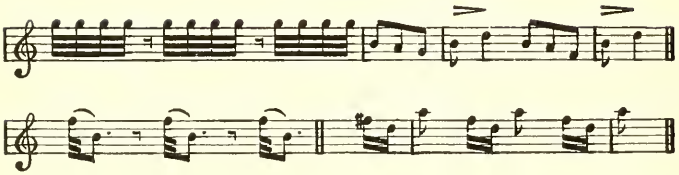
4. Bantam Cock.



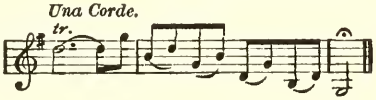
CUCKOO.



LARK.



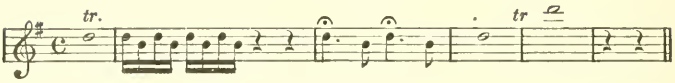
ASS.



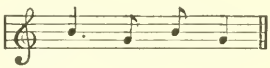
A. G. JOHNSTON.

(In " Birds of Jamaica," by Philip Henry Gosse.)

SOLITAIRE.



Sometimes thus : —



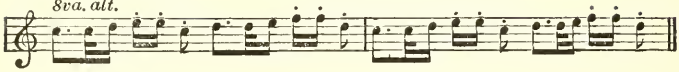
J. E. HARTING.

(In "Birds of Middlesex.")

BLACKCAP. (*Sylvia atricapilla.*)

Passage in song of.

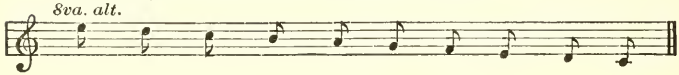
8va. alt.



WILLOW WARBLER. (*Sylvia trochilus.*)[1]

J. V. Stewart, in "Birds of the N. E. coast of Donegal."

8va. alt.



[1] "Its song, if deserving of that name, consists of ten whistling notes, which it runs through the gamut of B, thus: [*see* notation.] The latter notes are very soft, and run into each other." — Quoted in **Harting, J. E.: Birds of Middlesex**, p. 53.

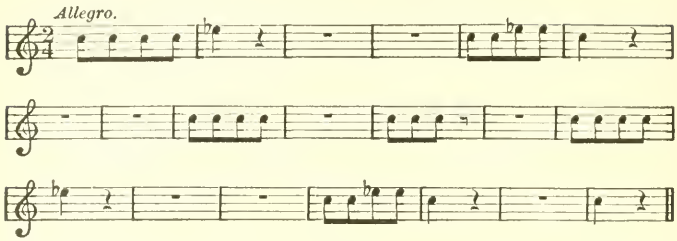
Mr. Harting, speaking of the methods of reproducing bird-songs, says:

"A flute or flageolet will give the proper sound, but the most perfect expression will be obtained with a small whistle, two and a half inches long, and having three perforations. . . . By reducing the length of the tube by a stop or plug, the whistle may, by experiment with the bird, be adjusted to the exact pitch, and the stop be then fixed. — **Harting, J. E.: Birds of Middlesex**, Introduction, p. ix.

"Colonel Hawker, in his 'Instructions to Young Sportsmen' (11th ed. p. 269), says: 'The only note which I ever heard the wild swan, in winter, utter, is his well-known 'whoop.' But one summer evening I was amused with watching and listening to a domesticated one, as he swam up and down the water in the Regent's Park. He turned up a sort of melody, made with two notes, C and the minor third, E flat, and kept working his head as if delighted with his own performance. The melody, taken down on the spot by a first-rate musician, Auguste Bertini, was as follows: [*See* Notation.]'

SWAN.

Singing on the water in Regent's Park. (*Auguste Bertini.*)



"The Abbé Arnaud has written some interesting remarks upon the voice of the swan.[1] He says : —

"'The swan, with his wings expanded, his neck outstretched, and his head erect, places himself opposite his mate, uttering a cry to which the female replies by another half a note lower. The voice of the male rises from A (*la*), to B flat (*si bemol*) ; that of the female from G sharp (*sol dièse*), to A.[2] The first note is short and transient, and has the effect which our musicians term *sensible;* so that it is not separated from the second, but seems to glide into it. Observe that, fortunately for the ear, they do not both sing at once ; in fact, if, while the male sounded B flat, the female gave A, or if the male uttered A while the female gave G sharp, there would result the harshest and most insupportable of discords. We may add that this dialogue is subjected to a constant and regular rhythm, with the measure of two times (?). The keeper assured me that during their amours, these birds have a cry still sharper, but much more agreeable.'" — **Harting, J. E.: Ornith. of Shakespeare, pp. 201, 202.**

[1] Wood's "Buffon," vol. xix. p. 511, note.

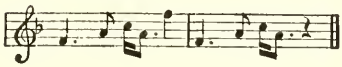
[2] This, it will be observed, differs materially from Colonel Hawker's observation.

SIR JOHN HAWKINS.

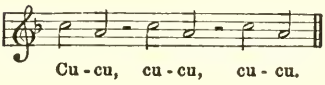
(In "History of Science and Practice of Music.")

BLACKBIRD.

Part of song.

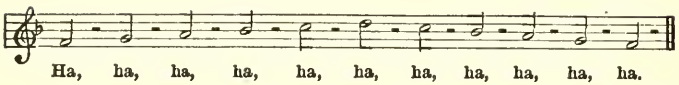


CUCKOO.



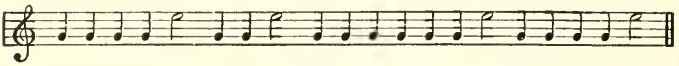
PIGRITIA, OR SLOTH.

KIRCHER.



HEN.

After laying. KIRCHER.

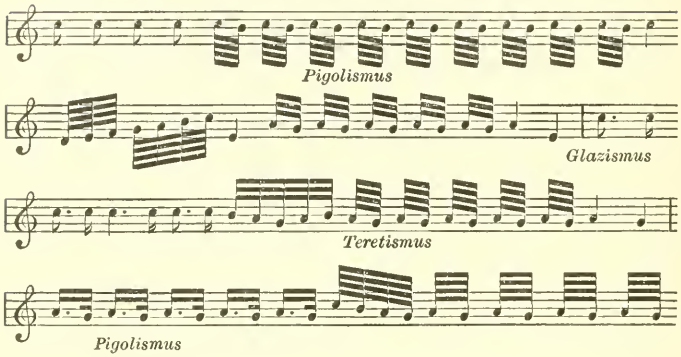


ATHANASIUS KIRCHER.

(In "Musurgia.")

NIGHTINGALE.[1]

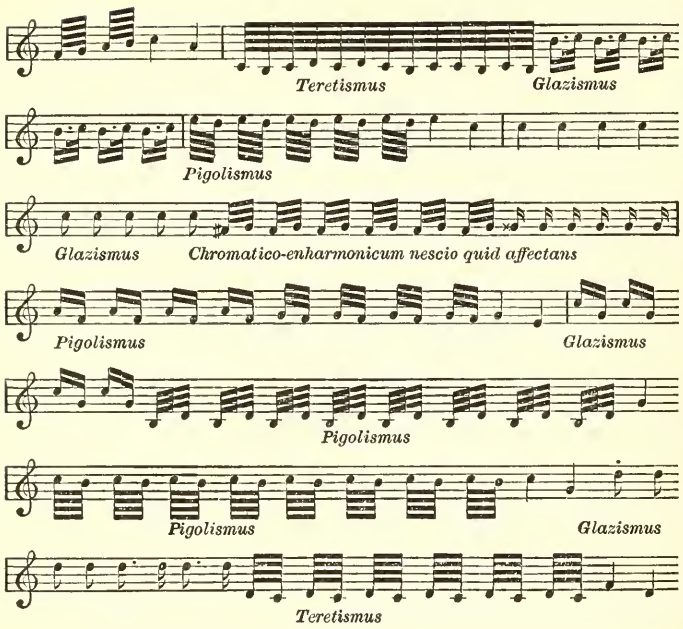
Glottismi modulationum sibilo exprimendi in Luscinia observati



[1] . . . unde infero Luscinias uti ad cantum ita & ad loquelam formandam haud ita ineptas esse, quam multi credant; atque adeo historiam illam de Lusciniis in Augustano diversorio Aldrouando teste, loquentibus non ita ἀδύνατον esse, ac quispiam sibi persuadere possit; imo omnes volucres quas natura harmonioso cantu instruxit, habiles quoque easdem ad humanam vocem formandam esse nihil dubito.

Regulus proximè sequitur Lusciniam, qui nonnullas in formandis glottismis clausulas mutuat à Luscinia, etsi minùs aptè & celeriter. Glottismos etiam, sed semper eodem modo format. Fringilla, Acanthis, Parix, Phænicopterus, Rubecula, alauda & quotquot sunt aves phonascæ, quarum tamen nulla ad eam modulationum varietatem, quam Luscinia exprimit, pertingit.

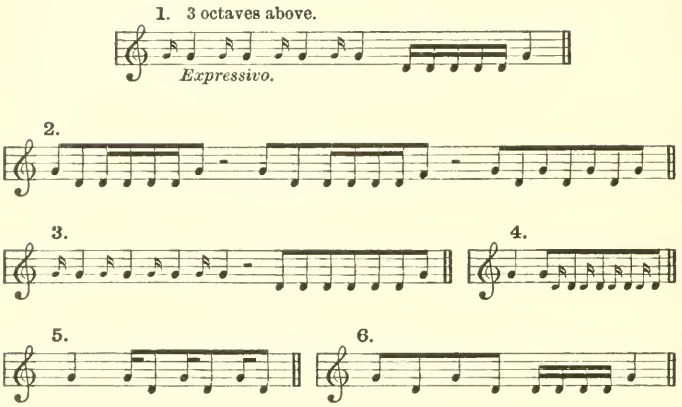
Reliquae volucres vocem quidem habent sonoram, sed nulla supramemorata glottismi specie adornatam, uti sunt, Gallus, Gallina, Coccyx, Hirundo, Upupa, Ulula, Coturnix, similesque cùm enim vox earum ad hominum delectationem non sit ordinata, eam tantùm vocem, quæ passionibus animi explicandis sufficiat, exprimunt. Sed non abs re me facturum existimavi, si quarundam voces hic musicis modulis referam.


Teretismus
Glazismus
Pigolismus
Glazismus
Chromatico-enharmonicum nescio quid affectans
Pigolismus
Glazismus
Pigolismus
Pigolismus
Glazismus
Teretismus

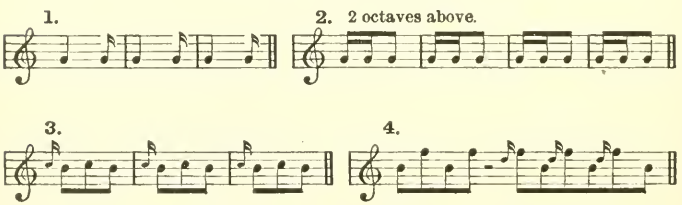
F. LESCUYER.

(In "Langage et chant des oiseaux." [1])

ROSSIGNOL.

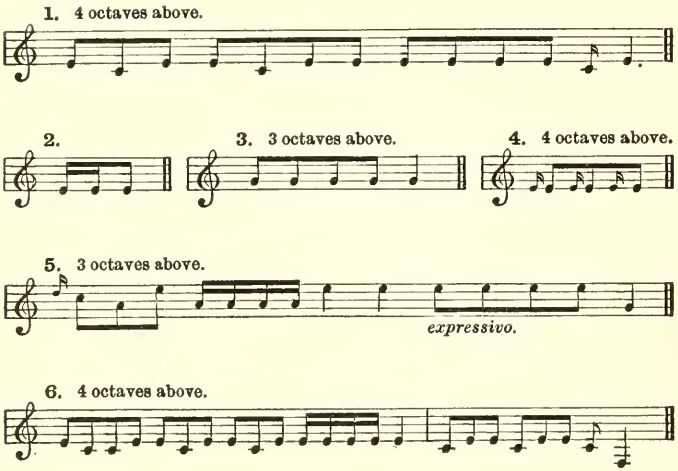


GRIVE CHANTEUSE.



[1] "Quand on a parlé du rossignol, il semble qu'il reste peu de choses à dire des autres solistes," says this author; but if his fantastic system of notation is here correctly deciphered the charm of the singer must lie in the quality of tone.

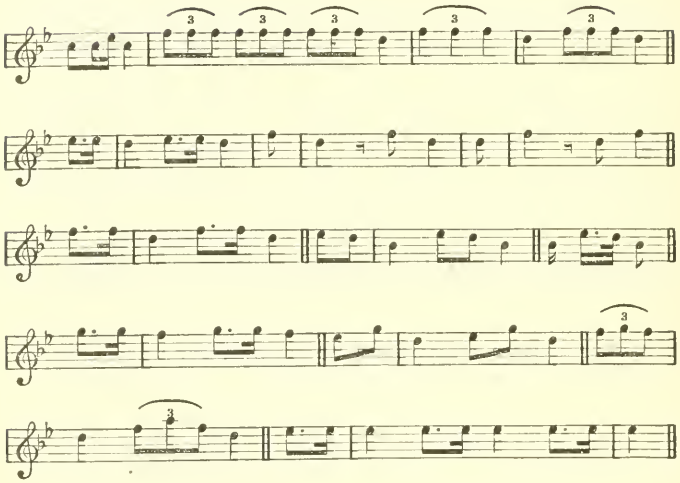
ALOUETTE DES CHAMPS.



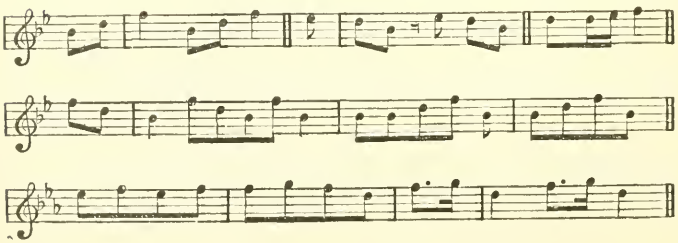
ALFRED SMEE.

(In "My Garden.")

THRUSH.



BLACKBIRD.



"The two birds which really, upon the whole, are the best songsters which build in my garden, where they exist in large numbers, are the song thrush (*Turdus musicus*), and the blackbird (*Turdus merula*).

"The song thrush sings from November till August. It is one of our most joyous songsters, beginning to sing early in the morning and continuing till late at night. The poet Browning, speaking of this bird, says: —

> 'The wise thrush
> . . . . . sings each song twice over,
> Lest you should think he never could recapture
> The first fine careless rapture.'
>
> . . . . . .

"The blackbird has a far softer and more melodious note than the thrush; but the note of the latter bird is more powerful, and his song more constant. Together they form a delightful harmony, but they more commonly sing alone than together. This country would be shorn of half its pleasure if we were deprived of the notes of the thrush and the blackbird.

. . . . . .

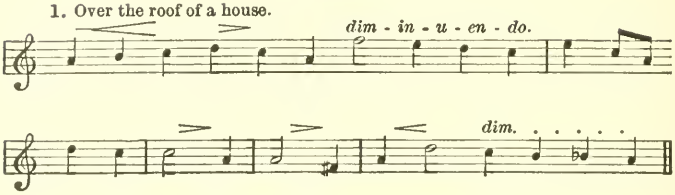
"Although birds delight us with their song, yet in my intercourse with musical men I have found but few that have the power of recording their notes. I therefore requested my brother, Mr. F. Smee, to visit my garden and endeavor to take down the notes of the birds as they sang. He reported that some of their musical phrases were in the minor key, and I have printed several of the strophes as they were sung." — **Smee,** Alfred: My Garden, pp. 550–553.

DR. F. WEBER.

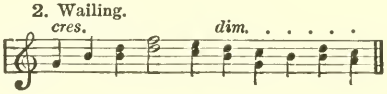
(In "Longman's Magazine," vol. ix., Feb. 1887, pp. 399, 400.)

WIND.

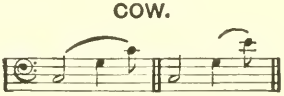
1. Over the roof of a house.



2. Wailing.

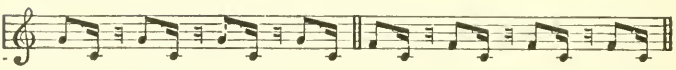


COW.

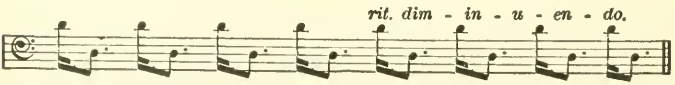


DOG.

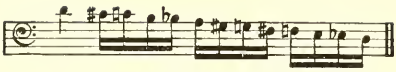
Barking.



DONKEY.

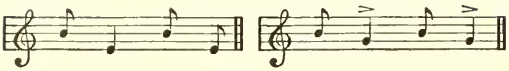


HORSE.

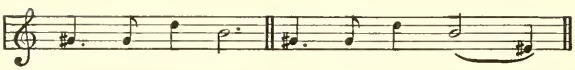


CAT.

1. 2. When excited.

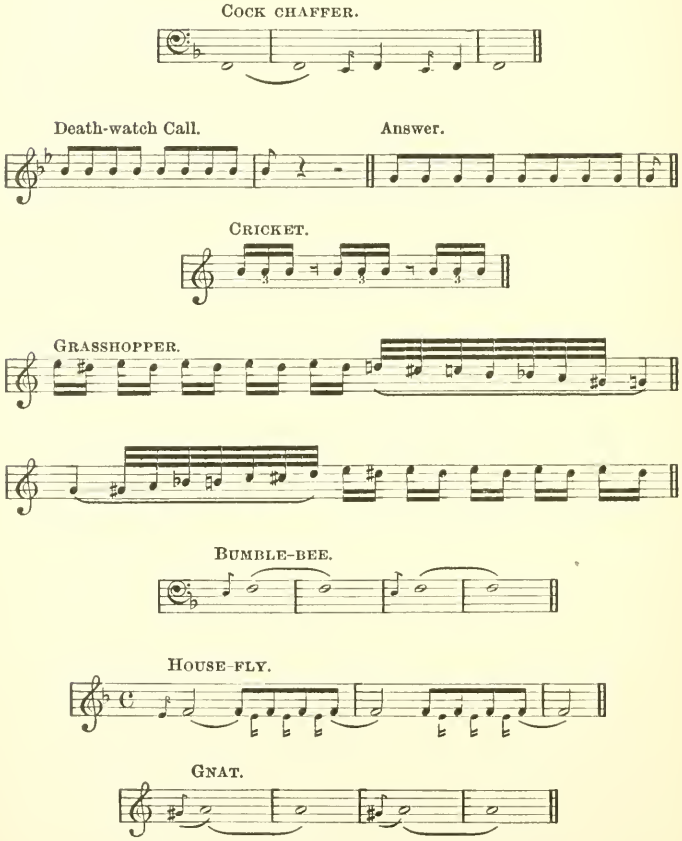


COCK.



ANNA HINRICHS.

(Summer's Natural Orchestra, in "The Popular Science News," vol. xxv. no. ix., September, 1891.)



BIBLIOGRAPHY.

BIBLIOGRAPHY.

* Indicates that the volume or article has not been examined by the editor.
** Indicates that the volume or article contains notations.

***Aaron,** S. F. Odd Bird Songs. (*Ornithologist and Oölogist,* vol. viii., April, 1883, p. 28.)

Abbott, C. C. Outings at Odd Times. N. Y., 1890.

—— Waste-land Wanderings (Song of Eels and Fishes), pp. 300–301. N. Y., 1887.

Agassiz, L., *and* Gould, A. A. Principles of Zoölogy. Boston, 1866.

Allen, C. N. Songs of Western Meadow Lark. (*In* Nuttall Ornithological Club. *Bulletin,* July, 1881.)

Allen, G. Æsthetic Feeling in Birds. (*Pop. Sci. Mo.,* vol. xvii., Sept., 1880, pp. 653–654.)

—— Ancestry of Birds. (*Longman's Mag.,* vol. iii., Jan., 1884, pp. 284–298.)

*—— Physiological Æsthetics. London, 1877.

Allen, J. A. Notes on Some of the Rarer Birds of Mass. (*Amer. Naturalist,* vol. v., Dec., 1869, pp. 509–510.)

American Museum of Natural History, N. Y. *Bulletins.*

Amory, Catherine. Birds in May. (*Swiss Cross,* vol. iii., no. 6, p. 1.)

—— Birds in Wood and Field. (*Swiss Cross,* vol. iv., 1888, no. 6, p. 162.)

Animal Love of Music. (*Harp. Mag.,* vol. xv., 1857, pp. 83–85.)

Animals, The Influence of Music on the Lower. (*All the Year,* N. S. vol. xxx., Dec., 1882, p. 538.)

Aristophanes. Comedies; with notes by W. J. Hickie. 2 vols. (The Birds, *in* vol. i.), London, 1877–78.

Asbury, Alice. Master-singers of Germany. (*Western Mo.,* vol. ii., 1869, pp. 272–276.)

Audubon, J. J. Birds of America. 7 vols. N. Y., 1840–44.

Auk, The: a quarterly journal of ornithology, ed. by J. A. Allen, Boston.

Austin, G. L. Friendship of Birds. (*Appleton's Journal,* N. S. vol. iii. p. 161.)

Australian Museum, Guide to the Contents of, p. 55. Sydney, 1890.

Axon, W. E. A. Voice of Animals. (*British Almanac,* 1885, pp. 104–114.)

Baily, W. L. Our Own Birds (U. S.). Phila., 1885.

Baird, S. F., *ed.* Ann. Record of Science, 1877. (*See* pp. 282–309.)

Baird, Brewer, *and* **Ridgway.** Hist. of N. American Birds. 5 vols. Boston, 1874.

Banvard, J. Curious Habits of Birds. Boston, 1850.

***Barrington,** D. Experiments and Observations on the Singing of Birds. (Roy. Soc. of London. *Phil. Trans.*, vol. lxiii., 1773, pp. 249–291.)

—— Language of Birds, The. (*In* Pennant's British Zoölogy, vol. iii.)

Bates, H. W. The Naturalist on the River Amazons. 4th ed. London, 1875.

Bechstein, J. M. Chamber and Cage Birds (Introduction). Tr. by W. E. Shuckard. London, n. d.

****Beckler,** D. H., *in* Gartenlaube, 1867.

****Belding,** L. Small Thrushes of California. (California Acad. of Science. *Proceedings*, vol. ii. 1889.)

Bicknell, E. P. A Study of the Singing of our Birds. (*The Auk*, vol. i., 1884, pp. 60, 126, 209, 322; vol. ii., 1885, pp. 144, 249).

Bird Lore. (*All the Year Round*, N. S. vol. xx., May 11, 1878, pp. 365–370.)

Bird Music. (*Littell's Liv. Age*, vol. xxix., 1851, p. 312.)

***Bird Singing at Night.** (*Naturalist's Note-book*, 1868, p. 252.)

Birds. (*North British Review*, vol. xxx., 1859, pp. 325–327.)

* **Birds** of Switzerland. (*Naturalist's Note-book*, 1868, p. 1.)

Birds of the Levant. (*Eclectic Mag.*, N. S. vol. vii., 1868, pp. 114–119.)

Birds' Tastes for Color and Music. (*Pop. Sci. Mo.*, vol. xxv., Sept., 1884, pp. 715–716.)

Birmingham, J. Notes of the Cuckoo. (*Nature*, vol. xxii., 1880, p. 76.)

***Blackwall,** J. Bemerkungen über den Vögelgesang. *In* Notizen aus dem Gebiete der Natur u. Heilkunde (Erfurt u. Weimar), vol. xi., 1825, pp. 292–296.

*—— Catalogue of Singing Birds, with the time of their beginning and ceasing to sing. — *Also,* of the Cuckoo. (*In* Manchester Lit. and Philos. Soc. *Memoirs*, 2d ser., vol. iv.)

—— *Same* abridged. (*In* Good, J. M., The Book of Nature, 1849, p. 189.)

*—— (*In* Philos. Mag. and Journal, London, vol. lxvi., July, 1825).

—— *See* Notes of Birds. (*Amer. Journ. of Sci. and Art;* ed. by B. Silliman, vol. x., 1882, p. 390.)

*—— Researches in Zoölogy. London, 1834.

Blanchard, É. Voice in Man and in Animals. (*Pop. Sci. Mo.*, vol. ix., Aug. and Sept., 1876, pp. 385–398, 513–523.)

Bonnier, P. Hearing in the Lower Animals. (*Pop. Sci. Mo.*, vol. xxxix., Oct. 1891, pp. 832–837.) *From* Revue Scientifique.

Boyle, *Mrs.* E. V. (G.) Days and Hours in a Garden. By "E. V. B." Boston, 1884.

Brand, J. Observations on Popular Antiquities. Rev. ed. London, 1877.

Brehm, A. C. Gefangene Vögel. 2 vols. Leipzig, 1871.

* **Brehm** *and* **Hausmann.** Journal für Ornithologie, 1855, pp. 348–351; 1856, pp. 250–255.

* —— *In* Naumania. 1855, pp. 54, 96, 181.

* **Brimley,** C. S. Mocking-bird. (*Ornithologist and Oölogist*, vol. xiii., Aug., 1888, p. 117.)

British Song-birds, Treatise on. Illus. Edinburgh, 1823.

Broderip, W. J. Zoölogical Recreations. London, 1862.

Buckland, F. Log-book of a Fisherman and Zoölogist. London, 1875.

—— Natural Trumpet of the Crane. (*Pop. Sci. Mo.*, vol. ix., 1876, pp. 137–140.)

Buffon, G. L. L., *Comte* de. History of Birds. 10 vols. (*Nat. Hist.*, vols. x.–xx.) London, 1812.

Buist, *Dr.* Bombay Times, Jan., 1847; Feb. 13, 1849.

* **Burgh,** A. Anecdotes of Music. 3 vols. London, 1814.

Burritt, E. English and American Birds. 16 pp. (*In* Life and Labors of E. Burritt, ed. by C. Northend, p. 311.)

Burroughs, J. Birds and Poets, with other Papers. N. Y., 1878.

—— Signs and Seasons. Boston, 1890.

—— Wake-robin. 2d ed. Boston, 1881.

Cabot, J. E. Our Birds, and their Ways. (*Atlantic Monthly*, vol. i., 1857, p. 211.)

California Academy of Sciences. *Proceedings.*

California Songsters. (*Overland Monthly*, vol. xiv., June, 1875, pp. 562–568.)

Charm of Birds, A. (*Fraser's Mag.*, vol. lxxv., June, 1867, p. 802.)

Church, *Mrs.* E. R. Birds and their Ways. Phila., 1884.

* **Clark,** J. W. Hooded Warblers. (*Ornithologist and Oölogist*, vol. vi., April, 1881, p. 9; Nov., 1881, p. 72.)

Clark, X. Animal Music: its Nature and Origin. (*Am. Nat.*, vol. xiii., April, 1879, pp. 209–223.)

** **Coleman,** A. P. Music in Nature. (*Nature*, vol. xxxvi., 1887, p. 605.)

Cooper, J. G. Land-birds of California and Adjacent States and Territories. Ed. by S. F. Baird. (Cal. Geol. Survey, vol. i.: *Ornithology.*) Cambridge, Mass., 1870.

Corwin, *Ship.* Cruise of the Revenue-steamer Corwin in Alaska and the N. W. Arctic Ocean. (U. S. Pub. Docs. *Ho. of Repr. 47th Cong., 2d sess. Ex. Docs.*, No. 105.)

Coues, *Dr.* E. Birds of the North-west. Boston, 1877.

Crowest, F. J. Musical Groundwork. (*See* Preliminary.) London, etc., 1890.

*Cunz, B. Die Singvögel der Ver. Staaten Nordamerika's. (*Die Natur*, vol. xx., 1871, pp. 279–280.)

Darwin, C. The Descent of Man. 2d ed. 1875.

—— Journal of Researches into the Nat. Hist., etc. N. Y., 1876.

Darwin, F. Life and Letters of C. Darwin, vol. ii. N. Y., 1887.

Davis, W. T. The Song of the Singing Mouse. (*American Naturalist*, vol. xxiii., 1889, pp. 481–484.)

*De Kay, J. E. Zoölogy of New York. 5 vols. (Vol. i.: Birds.) Albany, 1842–44.

Domestic Habits of Birds. (*Lib. of entertaining knowledge.*) London, 1833.

Domestic Occurrences, Sat., Oct. 9. (*Gentleman's Mag.*, vol. lxxii., part 2, 1802, p. 967.)

Edwards, W. H. A Singing Mouse. (*American Naturalist*, vol. iii., 1870, p. 551.)

Encyclopædia Britannica. Am. reprint, vol. iii., p. 629. Birds.

Encyclopædia Perthensis, vol. iii. Edin., 1816.

Evans, *Rev.* W. E. The Songs of the Birds; or, Analogies of Animal and Spiritual Life. London, 1888.

Fish, E. E. Birds' Tastes for Color and Music. (*Pop. Sci. Mo.*, vol. xxv., 1884, pp. 715–716.)

**Flagg, W. Birds of the Night. (*Atlantic Monthly*, vol. iv., Aug., 1859, pp. 171–184.)

**—— The Birds of the Pasture and Forest. (*Atlantic Monthly*, vol. ii., Dec., 1858, pp. 863–875.)

—— Songs and Eccentricities of Birds. (*Atlantic Monthly*, vol. xliv., Sept., 1879, pp. 349–356.)

—— The Winter-birds. (*Atlantic Monthly*, vol. iii., March, 1859, pp. 319–329.)

**—— A Year with the Birds. Boston, 1890. (*Same as* Birds and Seasons of New England. Boston, 1875.)

Fletcher, W. I., *ed.* The Co-operative Index to Periodicals (1884–1890).

Forbes, H. O. Sound-producing Ants. (*Nature*, vol. xxiv., 1881, pp. 101–102.)

Forbes, *Maj.* J. Eleven Years in Ceylon. London, 1840.

Forest and Stream. (Weekly.) New York.

Fowler, W. W. A Year with the Birds. 3d ed. London, 1889.

Francheschini, R. Musical Insects. 5 pp. (*Pop. Sci. Mo.*, vol. xxxix., Sept., 1891.)

Funk, N. Glockengeläute im Walde. (*Gartenlaube*, 1875, pp. 527–530.)

*Gainborg, *Dr.* How can we improve the Song of our Wild Birds? Copenhagen, 1800.

**Gardiner, W. The Music of Nature. Boston, 1838.

Gartenlaube, Die. Illustrirtes Familienblatt. Leipzig.

Gassendi, P. Vita Peireskii. (Opera Omnia, vol. v.) Florentia, 1727.

** **Gefiederte Welt**, Die. Ed. by Dr. Russ, Berlin.

* **Gibbs**, *Dr.* M. Song of the Golden-crowned Thrush. (*Ornithologist and Oölogist*, vol. x., Dec., 1885, p. 191.)

* **Giraud**, J. P., *Jr.* Birds of Long Island. N. Y., 1844.

Good, J. M. *In his* Book of Nature, vol. i., p. 189. Hartford, 1853.

Goodwin, W. L. Music in Nature. (*Nature*, vol. xxxvii., 1887–88, pp. 151–152.)

Gosse, P. H. Birds of Jamaica. London, 1847.

—— Romance of Nat. Hist. Boston, 1862.

Goulding, F. R. Brute-language. (*Appleton's Journal*, vol. x. pp. 332–335.)

Grahame, *Rev.* J. Birds of Scotland, with other poems. Boston, 1807.

* **Greene**, *Dr.* W. T. The Birds in my Garden. London (Rel. Tr. Soc.), 1889.

Griswold, W. M., *pub.* Cumulative Indexes (annual). Bangor.

Haldeman, S. S. Note on Animal Music. (*Amer. Nat.*, vol. xiii., July, 1879, p. 454.)

Hamerton, P. G. Chapters on Animals. London, 1874.

Hamilton, E. Wild-bird Life in London, past and present. (*Litt. Liv. Age*, vol. clxxxi., 1889, p. 673.)

Hamm, W. Die Vogelsprache. (*Die Gartenlaube*, 1866, p. 705.)

Hardy, J. Popular History of the Cuckoo. 45 pp. (*Folk-lore Soc.*, vol. iii. p. 47.)

** **Harting**, J. E. The Birds of Middlesex. London, 1866.

** —— The Ornithology of Shakespeare. London, 1871.

** **Hawkins**, *Sir* J. General History of the Science and Practice of Music. 2 vols. London, 1875.

Helmholtz, H. L. F. The Sensations of Tone as a Physiological Basis for the Theory of Music. Tr. by A. J. Ellis. London, 1875.

** **Henderson**, W. J. The Sportsman's Music. (*The Century*, vol. xxxiv., July, 1887, pp. 413–417.)

Hérissant, (——). Inquiry concerning the Organs of Voice in Quadrupeds and Birds. *In* Memoirs of the Roy. Acad. at Paris. (*Gentleman's Mag.*, vol. xxix., 1759, pp. 119–120.)

Hibberd, S. Minstrels of the Spring (English). (*Intellectual Observer*, vol. iii., March, 1863, pp. 112–119.)

—— The Minstrels of the Summer (English). (*Intellectual Observer*, vol. ii., Aug., 1862, pp. 18–28.)

—— Minstrels of the Winter (English). (*Intellectual Observer*, vol. v., Feb., 1864, pp. 17–25.)

Higginson, T. W. The Life of Birds. (*Atlantic Monthly*, vol. x., Sept., 1862, pp. 368–376.)

—— Out-door Papers. Boston, 1886.

** **Hinrichs**, *Miss* Anna. Summer's Natural Orchestra. 2 pp. (*Pop. Sci. News*, vol. xxv., Sept., 1891.)

** **Horsford**, B. Our Wood Thrushes. (*Forest and Stream*, vol. xviii., May 25, 1882.)

* **Howell**, A. H. Song of the Brown Thrasher. (*Ornithologist and Oölogist*, vol. xiii., July, 1888, p. 105.)

* **Hoxie**, W. My Mocking-birds. (*Ornithologist and Oölogist*, vol. xii., Sept., 1887, p. 146.)

Hudson, W. H. Music and Dancing in Nature. (*Longman's Mag.*, vol. xv., 1890, pp. 597–610.)

—— South American Bird-music. (*Nature*, vol. xxxiii., Dec. 31, 1885, pp. 199–201.)

Ibis: a magazine of general ornithology; ed. by P. L. Slader. London.

Ingersoll, E. Friends worth Knowing. N. Y., 1881.

** —— A Summer Bird. (*Harper's Mag.*, vol. liii., Sept., 1876, pp. 514–518.)

Ingersoll, E., *and others*. Habits of Animals. Chicago.

* **Insect Music**. *In* Landois' *Das Ausland*, vol. xliii., 1870, pp. 429–430.

Jaeger, B. Life of N. American Insects. N. Y., 1864.

* **Jefferies**, R. Field and Hedgerow. N. Y., 1890.

—— Wild Life in a Southern County. Boston, 1889.

Jesse, E. Favorite Haunts and Rural Studies. London, 1847.

—— Scenes and Occupations of Country Life. London, 1853.

* **Journ. für Ornithologie**. (Cassel) vol. iii., 1855, p. 348; 1856, p. 250.

Keeler, C. A. Song-birds about San Francisco Bay. (*Zoe*, vol. i., 1891, pp. 116–120.)

** —— Songs of some Californian Zonotrichiæ. (*Zoe*, vol. i., 1891, pp. 72–74.)

* **Kennedy**, (——). *In* N. Abhandl. baier. Akad. (*Phil. Abhandl.*) 1797, p. 169.

Kingsley, C. A Charm of Birds. (*Fraser's Mag.*, vol. lxxv., June, 1867, p. 802.)

** **Kircher**, A. Musurgia Universalis. Lib. i. cap. xiv. §5, p. 30. Romæ, 1590.

Knapp, J. L. The Journal of a Naturalist. 4th ed. London, 1838.

Knight, F. A. By Leafy Ways. Boston, 1889.

—— Idylls of the Field. Boston, 1890.

Laboulbène, *Dr.* A. Musical Organs of a Moth (*Chelonia pudica*). (*Ann. Soc. Entom. de France*, vol. iv. p. 689 *et seq.*, 4e sér.)

* **Landois,** H. *In* Das Ausland, vol. xliii., 1870, pp. 429–430.
*—— Thierstimmen. Freiburg, 1874.
*—— Die Ton- u. Stimmapparate der Insecten in anatomisch-physiologischer u. akustischer Beziehung. Leipzig, 1867.
*—— Westfalens Thierleben in Wort u. Bild. 2 Bde. Paderborn, 1884–86.
** **Leach,** *Dr.* M. L. Song of the White-throated Sparrow. (*Swiss Cross,* vol. iii., May, 1888, pp. 144–145.)
**—— The Song of the White-throated Sparrow. (*Forest and Stream,* vol. xxiv., Feb. 19, 1885, p. 65.)
Lee, H. Singing Mice. (*Pop. Sci. Mo.,* vol. xiv., 1878, p. 102.)
Leopardi, G. Panegyric of Birds. — The Song of the Wild Cock. (*In his* Essays and Dialogues; tr. by C. Edwardes, pp. 144–151.)
Le Page du Pratz, (——). History of Louisiana. 2 vols. London, 1763.
** **Lescuyer,** F. Langage et Chant des Oiseaux. Paris, 1878.
* **LeVaillant,** F. Histoire naturelle des Oiseaux d'Afrique. 6 vols. Paris, 1798–1812.
Lewis, E. J. The American Sportsman. Philadelphia, 1879.
Lindsay, *Lady* A. About Robins: Songs, Facts, and Legends. N. Y., 1889.
Lindsay, W. L. Mind in the Lower Animals. 2 vols. N. Y., 1880.
** **Lockwood,** *Rev.* S. A Singing Hesperomys. (*Amer. Nat.,* vol. v., 1871, p. 761.)
Lost Hunter. Published by Derby and Jackson, about 1855.
Lowell, J. R. My Garden Acquaintance. (*Modern Classics.*) Boston, cop. 1871.
Lucretius Carus, T. Lib. v. line 1417.
Lunt, H. Across Lots. Boston, cop. 1888.
Lyford, *Prof.* A. C. The Greek Poets and the Birds. (*Education,* vol. xi. no. 8, April, 1891.)
Macgillivray, W. History of British Birds. 5 vols. (*See* vol. ii. p. 34.) London, 1837–52.
** **Macy,** C. An Operatic Bird. (*The Swiss Cross,* vol. ii., Aug., 1887, p. 64.)
* **Martin,** W. C. L. *In his* Gen. Introduction to Nat. Hist. of the Mammiferous Animals (London, 1841), p. 432.
** **Mayer,** A. M., *ed.* Sport with Gun and Rod.
* **Maynard,** C. J. Birds of Eastern North America. N. Y., 1882.
—— Das Brüllen der amerikanischen Rohrdommel. (*Ornith. Monatsschrift des deutschen Vereins z. Schutze der Vogelwelt,* vol. xv. no. 9, pp. 242–254.)
Merriam, F. A. Birds through an Opera Glass. Boston, 1889.

* **Meyer,** A. B., *and* Helm F. Jahresberichte der ornithologischen Beobachtungstationen im Königreich Sachsen.

* **Michelet,** J. L'oiseau. 5e ed. Paris, 1858.

Miller, O. T. Bird-ways. Boston, 1885.

Mimicry of Birds. (*Nature*, vol. xvii., 1878, p. 438.)

Minot, H. D. English Birds compared with American. (*American Naturalist*, vol. xiv., 1880, p. 563.)

—— The Land-birds and Game-birds of New England. Illus. Salem, Mass., 1877.

Mivart, St. G. Lessons from Nature, as manifested in Mind and Matter. London, 1876.

* **Montagu,** *Col.* G. *In* Ornithological Dictionary. 1833, p. 475.

Müller, J. Researches in the Comparative Anatomy of the Vocal Organs of Birds. (*Berlin Acad.*, 1845, and *Ann. and Mag. of Nat. Hist.*, vol. xvii. p. 499.)

Müller, K. Ein Lieblingsvogel des Volkes. (*Gartenlaube*, 1876, p. 700.)

Munger, C. A. Four American Birds. (*Putnam's Mag.*, N. S. vol. iii., 1869, pp. 728–729.)

* **Murdoch,** J. B. Black Partridge calling, perched on a Tree. (*Stray Feathers*, vol. x., 1881, p. 169.)

Music, Animal Love of. (*Harp. Mag.*, vol. xv., 1857, pp. 83–85.)

Music in Speech. (*Litt. Liv. Age*, vol. l., 1856, p. 228.)

Music in the Mammoth Cave. (*Litt. Liv. Age*, vol. lxviii., 1861, p. 284.)

Music of the Wild. (*Litt. Liv. Age*, vol. xxi., 1849, pp. 475–476.)

** **Music,** On. (*New Monthly Mag.*, vol. vii., 1823, p. 303.)

Music on the Lower Animals, The Influence of. (*All the Year*, N. S. vol. xxx., Dec, 1882, p. 538.)

Music, Phenomena of. (*Eclec. Mag.*, N. S. vol. ix., 1869, pp. 368–372.)

Musical Fishes. (*Pop. Sci. Mo.*, vol. xxiii., Aug., 1883, p. 571.)

Musicians of our Woods. (*Harp. Mag.*, vol. xix., 1859, pp. 323–327.)

Musikalischen Insecten (Die), und ihre Instrumente. (*Gartenlaube*, 1872, pp. 698–699.)

Natural History of Birds. Harper & Bros. N. Y., 1840.

Natural History of English Song-birds. Copied from Natnre by E. Albin. London, 1779.

* **Naumann,** J. F. Zwei Arten Singschwäne in Deutschland. (*Archiv für Naturgeschichte*. 4. Jahrg. Bd. i., 1838, p. 361.)

Nehrling, H. North Amer. Birds. Part i., 1889. Milwaukee, Wis.

Nelson, E. W. Birds of Bering Sea and the Arctic Ocean. (U. S. Pub. Docs. *Cruise of Corwin*, 1881.)

Nelson, H. L. Bird-songs about Worcester. Boston, 1889.

New Monthly Magazine, vol. xxi. part iii. June 1, 1872, p. 269 (Somersetshire).

* **New York** Law on Song-birds. (*Ornithologist and Oölogist,* vol. xi., Nov., 1886, p. 169.)

Nicols, A. Snakes, Marsupials, and Birds. London, n. d.

Nightingale (*Motacilla luscinia*), The. (*Litt. Liv. Age,* vol. xxv., 1850, pp. 273–278.)

Nightingale, The. (*Litt. Liv. Age,* vol. xlii., 1854, pp. 612–614.)

Notes and Queries. London, 1850–91.

Notes of Birds. (*Am. Journal of Science and Arts,* vol. x., Feb., 1826, pp. 390–391.)

Nuttall, T. Manual of Ornithology of the U. S. and Canada. 2d ed. (Land-Birds, pp. 510–511.) Boston, 1840.

Nuttall Ornithological Club. *Bulletins.* N. Y.

Nutting, C. C. On a Collection of Birds from Nicaragua. (U. S. Nat. Mus. *Proceedings,* vol. vi., 1883.)

Obituary of Considerable Persons. (*Gentleman's Mag.,* vol. lvii. part ii., 1787, p. 1197.)

Oppel, *Prof., of Frankfurt on Main.* Über Vögelstimmen, etc. (*Der zoologische Garten,* vol. xii., Feb., 1871.)

Ornithologist and Oölogist. An original magazine devoted to birds, their nests and eggs. Ed. and pub. by J. M. Wade. Norwich, Conn. Cf. The Oölogist.

Our Birds. (*New England Mag.,* vol. i., 1831, p. 227.)

Our Feathered Immigrants. *The West Shore* (Pub. in Portland, Ore.), March, 1889, no. 3, p. 115.

Owen, *Sir* R. Anat. of Vertebrates, vol. iii. p. 600.

* **Paolluci,** *Prof.* L. Il canto degli uccelli, p. 130. Milano, 1878.

Peal, S. E. Sound-producing Ants. (*Nature,* vol. xxiv., 1881, p. 485.)

—— Sounds made by Ants. (*Nature,* vol. xxii., 1880, p. 583.)

—— Voice in Fish. (*Nature,* vol. xxi., Nov., 1879, p. 55.)

Phenomena of Music. (*Eclec. Mag.,* N. S. vol. ix., 1869, pp. 368–372.)

Placzek, *Dr.* B. Why Birds sing. (*Pop. Sci. Mo.,* vol. xxvi., April, 1885, pp. 541–546.)

Plinius Secundus, C. Natural History, book x. chap. xliii., The Nightingale.

** **Pole,** W. Music in Nature. (*Nature,* vol. xxxvi., 1887, p. 343.)

Pollard, J. Favorite Birds, and what the Poets sing of them. N. Y., 1888.

Pontécoulant, A. *Marquis* de. Les Phénomènes de la Musique. (*Lib. internationale.*) Paris, 1868.

Poole, *Dr.* W. F. Index to Periodical Literature to Jan. 1, 1882. Boston.

—— *and* Fletcher, W. I. *Same.* Supplement 1882–86. Boston, 1888. (For continuation *see before, under* Fletcher, W. I.)

R., M. H. Songs of Birds. (*Notes and Queries*, 3d ser., vol. xii., Aug. 3, 1867.)

***Rainey**, H. J. Cries of Owls. (*Stray Feathers*, vol. iii., 1875, p. 332.)

Rhoads, S. N. The Mimetic Origin and Development of Bird Language. (*American Naturalist*, vol. xxiii., 1889, pp. 91–102.)

Ridgway, R. A Manual of North American Birds. Phila., 1887.

—— Song Birds of the West. (*Harper's Mag.* vol. lvi., May, 1878, pp. 857–880.)

Romanes, G. J. Animal Intelligence. N. Y., 1883.

Royal Society of London. Philosophical Transactions. 1665 to 1891.

Samuels, E. A. Our Northern and Eastern Birds. N. Y., 1883.

***Saunders**, W. E. Blue-bird as a Mimic. (*Ornithologist and Oölogist*, vol. xii., April, 1887, p. 61.)

***Savart**, (—). *In* Froriep, L. T. v. Notizen aus dem Gebiete der Natur und Heilkunde. 1826, pp. 1, 20.

***Saxby**, H. L. Notes upon the Migration and Song of the Skylark. (*Zoölogist*, vol. xx., 1862, no. 8281.)

Schele de Vere, M. R. B. Music in Nature. (*Putnam's Mag.*, N. S. vol. vi., 1870, pp. 173–182.)

—— Stray Leaves from the Book of Nature. N. Y., 1856.

Scudder, S. H. The Songs of the Grasshoppers. (*American Naturalist*, vol. ii., 1868, p. 113.)

***Seebohm**, H. Geographical Distribution of the Family Charadriidæ. London, 1887.

Sharpe, R. B. Birds in Nature. London, 1888.

Sidebotham, J. Singing Mice. (*Nature*, vol. xvii., 1877, p. 29.)

Singing of the Mice. (*Nature*, vol. xvi., 1877, p. 558.)

Skelding, S. B., *ed.* Bird-songs Series. 6 vols. N. Y., 1886–87.

Slater, H. H. Singing Mice. (*Nature*, vol. xvii., 1877, p. 11.)

****Smee**, A. My Garden. London, 1872.

Smithsonian Institution. Catalogue of Scientific and Technical Periodicals, 1665 to 1882; together with a Library Check-list. By H. C. Bolton. (*Misc. coll.*, no. 514.)

Spencer, H. Origin and Function of Music. (*Fraser's Mag.*, vol. lvi., 1857, p. 396.)

Stearns, R. C. Instances of the Effects of Musical Sounds on Animals. (*American Naturalist*, vol. xxiv., 1890, pp. 22, 123, 236.)

Stearns, W. A. New England Bird-life. Rev. and ed. by Dr. E. Coues. 2 vols.

* **Stein**, F. Über die geographische Verbreitung und die Lebensweise der südamerikanischen Singvögel. (*Archiv für Naturgeschichte*, 5. Jahrg. Bd. i., 1839, p. 235.)

Sterne, C. Das erste Ständchen. (*Gartenlaube*, 1875, pp. 787–789.)

* **Storer**, D. H., *and* Peabody, W. B. O. Reports on the Fishes, Reptiles, and Birds of Massachusetts. (Mass. *Commonwealth.*) Boston, 1839.

Stridulating Crustaceans. (*Nature*, vol. xviii., 1878, pp. 53, 95.)

Stridulation of Butterflies. (*In* Baird, S. F. *Ann. Record of Science.*) 1877, p. 309.

Stridulation of Scorpions. (*In* Baird, S. F. *Ann. Record of Science.*) 1877, p. 282.

Sturt, *Capt.* C. Narr. of an Exped. into Central Australia. 2 vols. London, 1849.

Sully, J. Animal Music. (*Cornhill Mag.*, vol. xl., 1879, p. 605.)

* —— Sensation and Intuition. London, 1874.

Swiss Cross, The: Magazine of Popular Science. N. Y., monthly.

Taylor, Charlotte. Musicians of Field and Meadow. (*Harp. Mag.*, vol. xxvi., 1862–63, pp. 495–501.)

* **Taylor**, H. R. Mocking-bird as a Mimic. (*Ornithologist and Oölogist*, vol. xiii., Aug., 1888, p. 117.)

* —— Songs in the Night. (*Ornithologist and Oölogist*, vol. xiv., May, 1889, p. 69.)

Taylor, J. E. Half-hours in the Green Lanes. 7th ed. London, 1890.

Taylor, R. Te ika a maui; or, New Zealand and its Inhabitants. London, 1870.

Tennent, *Sir* J. E. Sketches of the Nat. Hist. of Ceylon. London, 1861.

** **Thayer**, E. M. Music of Niagara. (*Scribner's Mag.*, vol. xxi., 1880, pp. 583–586.)

Theuriet, A. Song-birds and Seasons. Boston, 1888.

Thompson, M. Sylvan Secrets, in Bird-songs and Books. N. Y., 1887.

Thomson, J. S. Mimicry of Birds. (*Nature*, vol. xvii., 1878, p. 361.)

Thoreau, H. D. Early Spring in Massachusetts. Boston, 1881.

—— Summer: from (his) Journal. Ed. by H. G. O. Blake. Boston, 1884.

—— Winter: from (his) Journal. Ed. by H. G. O. Blake. Boston, 1888.

Torrey, B. Birds in the Bush. Boston, 1885.

—— A Rambler's Lease. Boston, 1889.

Treatise on British Song-birds. With introd. by P. Syme. Illus. Edinburgh, 1823.

Unsere Wintergäste (German Winter-birds). *Gartenlaube*, 1868, pp. 126–127.

U. S. Dept. of Agriculture. Division of Ornithology and Mammalogy. *Publications.* Washington.

U. S. National Museum. *Proceedings.*

Viardot, L. On the Æsthetic Sense in Animals. Tr. by A. R. Macdonough. (*Pop. Sci. Mo.*, vol. iv., 1873, pp. 729–735.)

Vogelsprache, Die. (*Gartenlaube,* 1866, pp. 705–707.)

* **W.,** J. M. City Singers. (*Ornithologist and Oölogist,* vol. xii., March, 1887, p. 40.)

Wallace, A. R. *In* Contribution to the Theory of Natural Selection, p. 220. London, 1872.

—— Darwinism: an Exposition of the Theory of Natural Selection. London, 1889.

—— The Malay Archipelago. (Great Bird of Paradise, pp. 466–467.) N. Y., 1869.

Walton, I. The Complete Angler. London, 1875.

Warren, *Uncle* (*pseud.*). Birds: Their Homes and Their Habits. Phila., 1887.

Waterton, C. Essays on Natural History, chiefly Ornithology. London, 1838.

—— Wanderings in South America. London, 1879.

Watt, R. Bibliotheca Britannica; or, General Index to British and Foreign Literature. 4 vols. Edinburgh, 1824.

** **Weber,** *Dr.* F. On Melody in Speech. (*Longman's Mag.*, vol. ix., 1887, pp. 399–411.)

Wheelwright, H. W. Ten Years in Sweden. (*See* Musical Frogs.) London, 1865.

White, *Rev.* G. Natural Hist. of Selborne. London, 1878.

* **Wienland,** D. F. Von Vogelgesang. (*Die Natur,* vol. viii., 1859, pp. 225–228.)

* **Willy,** T. P. A Talking Robin. (*Ornithologist and Oölogist,* vol. vi., July, 1881, p. 39.)

Wilson, *Dr.* A. American Ornithology. Phila., 1810.

—— Songs without Words. (*Eclec. Mag.,* N. S. vol. xxxvi., 1882, pp. 737–745.)

Wood, *Rev.* J. G. Strange Dwellings. Boston, 1872.

World of Wonders. (Talking Birds, pp. 395–396.) London, 1888.

Yarrell, W. History of British Birds. 3 vols. London, 1856.

—— History of British Fishes. 3 vols. London, 1856.

* **Young,** R. Song of the Mocking-bird. (*Forest and Stream,* vol. ix., Aug. 16, 1877, p. 24.)

Zoe: a biological journal (quarterly). San Francisco, Cal.

Zoölogist, The: a popular miscellany of natural history. Conducted by E. Newman. Third Series. Ed. by J. E. Harting. (Cf. The Entomological Mag.)

ACKNOWLEDGMENTS.

THE editor is under obligations to the following authors and publishers for prompt response to his calls upon their generosity; and while others might well be mentioned, he must not omit to express special indebtedness to Mr. A. J. Rudolph, First Assistant Librarian of the San Francisco Free Public Library, for skilled assistance in the proof-reading, and in the preparation of the index.

Allen, Grant. — **Allen,** J. A., Curator American Museum of Natural History, Central Park, N. Y. — **Amory,** Catherine F., Editor of the "Swiss Cross." — **Belding,** L. — **Bicknell,** Eugene P. — **Brewster,** William. — **Burroughs,** John. — **Coleman,** A. P., Faraday Hall, Victoria University, Coburg, Ontario. — **Collier,** P. F., Editor of "Once a Week." Permission to quote from E. A. SAMUELS, Our Northern and Eastern Birds. — **Coues,** *Dr.* Elliott. — **Educational Publishing Company,** permission to quote from W. FLAGG, A Year with the Birds. — **Estes** *and* **Lauriat,** permission to quote from Dr. ELLIOTT COUES, Birds of the North-west; H. D. MINOT, Land-birds and Game-birds of New England. — **Fewkes,** *Dr.* J. Walter, Boston Society of Natural History. — **Foster,** L. S., Publisher of "The Auk." — **Golz,** *Dr. Justizrath,* Berlin. — **Goodwin,** W. L., Queen's University, Kingston, Ontario. — **Granauer,** *Dr.* F., of K. K. Universitäts-Bibliothek, Vienna. — **Horsford,** B. — **Houghton, Mifflin, & Co.,** permission to quote from B. TORREY, Birds in the Bush. — **Ingersoll,** Ernest. — **Leach,** *Dr.* M. L. — **Little, Brown, & Co.,** permission to quote from S. F. BAIRD, T. M. BREWER, and R. RIDGWAY, Hist. of Amer. Birds; H. L. NELSON, Bird-songs about Worcester. — **Macmillan & Co.,** permission to quote from C. WATERTON, Wanderings in South America. — **Mayer,** Alfred M., Professor of Physics, Stevens Institute of Technology, Hoboken, N. J. — **Merriam,** C. Hart., Ornithologist

U. S. Dep't of Agriculture. — **Miller,** Olive Thorne. — **Minot,** Henry D. — **Palmer,** T. S., Acting ornithologist, U. S. Dep't of Agriculture. — **Pfluger,** C. F., Sec'y of the Soc. for the Introduction of Useful Singing-birds into Oregon. — **Ridgway,** Robert, Smithsonian Institution. — **Russ,** *Dr.* Karl, Editor of "Die gefiederte Welt." — **Samuels,** Edward A., President of Massachusetts Fish and Game Protective Association. — **Sully,** J. — **Thomae,** F., Librarian, University Library, Tübingen. — **Thompson,** Maurice. — **Torrey,** Bradford. — **Walker,** R. C., Principal Librarian Free Public Library, New South Wales. — **Weber,** *Dr.* F., *of London.* — **Youmans,** W. J., Popular Science Monthly.

INDEX.

INDEX.

Aaron, S. F., 229.
Abbott, *Dr.* C. C., 126, 229.
Aberdevine, 180.
Accentor, Golden-crowned. *See* Oven-bird.
Æsthetic sense denied to animals, 142.
Agassiz, L., *and* Gould, A. A., 140, 229.
All the year round (magazine), 142, 171, 229, 230, 236.
Allen, C. N., 229.
Allen, G., 135, 229, 241; Harmonic intervals in bird-music, 134; Oven-bird, 167.
Allen, J. A., 229, 241; Baltimore oriole, 168; Blue Jay, 168; Crow, 168; Meadow-lark, 168; Oriole, 168; Towhee, 168.
Alouette des champs. Notations, 221.
American goldfinch. *See* Yellow-bird.
American journal of science and arts, 175, 237.
American Museum of Natural History, N. Y., 229.
American naturalist (magazine), 141.
American nightingale. *See* Thrush (*turdus fuscescens*).
American warblers. *See* Warbler (*sylvicolidæ*).
Amory, Catherine, 158, 165, 229, 241.
Animals, Æsthetic sense denied to, 142; Voices of, *See* Notations.
Ant, Music of, 128.
Antrostomus vociferus. *See* Whip-poorwill.
Ape (Gibbon), Music of, 129.
Aristophanes, 182, 229.
Arnaud, *Abbé.* Voice of swan, 216.
Asbury, Alice, 229.
Ass, 129; Gardiner, W. Notation, 213.
Assisi, Saint Francis d'. *See* Francis d'Assisi.
Atrichias, Ventriloquism among the, 210.
Audubon, J. J., vi, vii; Drumming of partridge, 196, 197, 198, 229; Inability to describe the songs of birds, 114; Night-hawk booming, 196; Oven-bird, 166.
Augurs. Signs from birds, 171.
Auk, The (magazine), 229.
Ausland, Das (magazine), 234.
Austin, G. L., 229; Bullfinch, 175.
Australia. Plumage of birds, 210; Bird-songs in, 209.
Australian Museum, Guide to, 210, 229.
Author, Letters, notes, etc., by. Author's power of memory, 188; Autograph (*facsimile* and transcript) of, x, xi. Bird-songs at Lynn and Franklin, 158; Bobolink, 192; Collection of bird-songs, when begun, v; Extemporizing of the field-sparrow, 148; Improvement in bird-song, 174; Instrument for taking pitch of bird-songs, 191; Last days of, 171; Mode of taking the bird-songs, 161; Newness of the field, 113, 114, 116, 121, 124; Night-hawk booming, 196; Notation of Indian-songs from the phonograph, 172; Notations from diary of, 205; Notations of song-sparrow by W. Flagg and the author, 125; Song of a caged robin, 174; Song of bobolink cannot be copied,

115; Song of oriole at burial of, 170; Song of Wilson's thrush, 164; Thaxter, C., on loons, 200; Whip-poorwill, 168; Wood-pewee, 143; Wood thrush, 161.
Axon, W. E. A., 140, 229.

Baily, W. L., 229.
Baird, S. F., 128, 230, 239.
Baird, Brewer, *and* Ridgway, 149, 230; Fox-colored sparrow, 155; Hermit thrush, 165; Oven-bird, 167; Scarlet tanager, 185; Tawny thrush, 163; Wood thrush, 162, 165.
Baltimore oriole. *See* Oriole (*icterus Baltimore*).
Banvard, J., 230.
Barrington, D., 230; Definition of bird-song, 122; Imitation in singing-birds, 174, 175; Intervals in bird-songs, 121; Song-birds, quoted by W. J. Broderip, 121; Table of comparative merit of British singing-birds, 180.
Bates, H. W., 128, 230; Cricket music, 128; Organ-bird, 186.
Batty, J. H. Drumming of partridge, 198.
Bechstein, J. M., 193, 230.
Beckler, D. H., 230; Notations by, referred to by Dr. Golz, 115; Various notations of bird-songs (and note by editor), 208.
Bee. Hinrichs, A. Notation, 226.
Belding, L., 230, 241; Big-tree thrush, 162; Variations in bird-songs, 163.
Bell-bird, 195; Waterton, C., 196.
Berthoud, H. Bird of paradise, 186.
Bertini, A. Swan (notation quoted by J. E. Harding), 216.
Bicknell, E. P., 146, 230, 241; Effect of moult and fatness on the singing of birds, 147; Oven-bird, 166; Song-sparrow, 147.
Bird language. *See* Bird-song.
Bird music. *See* Bird-song.
Bird of paradise. Berthoud, H., 186.
Bird-song. (*See also* Bird-songs.—Birds.—Borrowing from the birds.—Imitation. — Music. — Night-songs. —Notations.—Songs.—Song-birds.) Affinity of tones, 6; Allen, G. Harmonic intervals in, 134; Allen, J. A. Variations in, 168: At Franklin, 158; At Lynn, 158; At Worcester, 158; Audubon, J. J. Inability to describe the songs of the birds, 114; Barrington, D. Definition of, 122, Intervals in, 121, Table of comparative merit of British singing-birds, 180; Belding, L. Variations in, 163; Bicknell, E. P. Effect of moult and fatness on, 147; Birds sing flat, 152; Birds sing out of tune, 152; Bright plumage *vs.* song, 185; Burgh, A. Birds are instinctive musicians, 135; Childish writing on music of the birds, 124; Development of, 8; Energy expended in, 190; Evolution of, 5, 138; Gassendi, P. Prefers bird-song to human music, 133; Genesis of, 5, 134; Harmonic affinities in, 132, 133; Harmony produced by bird-notes, 200; Improvement in, 174; Indescribable, 7, 166; Intervals in, 133; Jesse, E. Variations in, 173; Knapp, J. L. No improvement in, 176; Localities, 113; Miller, O. T. Variations in, 169; Morning song in Jamaica, 153; Nelson, H. L. Change in key, 164; Organs of song, 140; Pitch in, 131; Placzek, *Dr.* B. Origin of the song-habit, 139; R., M. H. Bird-songs cannot be copied, 114; Rhythm in, 131, 154, 208; Structure of melody, 130; Sully, J. Intervals in, 132, Rhythm in, 131, Sexual selection improves voice, 138, Tonality in, 132; Sustentation of tones in, 117; Time in bird music, 131; Tonality or key in, 131; Torrey, B., 138; Variation in the singing of same birds, 8; Variation of song between young and old birds, 25, 26; Various notations of music of nature, 203; Waltz and bird-songs compared, 134; Whistling

of birds, 133; Why birds sing, 5, 139.
Bird-songs. (*See also* Bird-song. — Birds.—Imitation.—Music.—Night-songs.— Notations. — Songs.) Are not music, 123; Author's collection of, when begun, v; Author's mode of taking, 161; Big-tree thrush and wood thrush, 162 ; Flagg, W. On copying of, 114; Fowler, W. W. Bird-songs cannot be copied, 114; Golz, *Dr.* Bird-songs can be copied, 115; Harting, J. E. Reproducing of, 215; Illustrations of, in refutation of Wm. Pole, 123.
Birds. (*See also* Bird-song. — Bird-songs. — Borrowing from the birds. — Song-birds.) Dancing of, 136; Imported songsters, 182; Jenner, *Dr.* Signs from, 171; Legend of Saint Francis d'Assisi, 170; Plumage of, in Australia, 210 ; Prices of imported singing-birds, 184.
Birmingham, J., 230.
Bishop. Buffon, G. L. L., *comte* de. Organist same as, 186; Le Page du Pratz, (—), 186.
Black-billed cuckoo. *See* Cuckoo (*coccygus erythrophthalmus*).
Blackbird (*turdus merula*), 176, 180; Notations: Gardiner, W., 211, Hawkins, *Sir* J., 217, Smee, A., 222; Smee, A., 223.
Blackcap, 180; Harting, J. E. Notation, 215.
Black-capped titmouse. *See* Chickadee (*parus atricapillus*).
Black-throated green warbler. *See* Warbler (*dendroica virens*).
Blackwall, J , 175, 230.
Blake, G. Loon, 200.
Blanchard, É., 140, 230.
Blue Jay. Allen, J. A., 168.
Bluebird (*sialia sialis*). (*See also* Catbird, 52.) Minot, H. D., 144; Nelson, E. W., 145; Notations, 11; Nuttall, T., 145.
Bob White. *See* Quail.
Bobolink (*dolichonyx oryzivorus*), 82, 175, 191; Cheney, S. P. Song cannot be copied, 7, 115; Difference between song of old and young, 26; Hayward, *Miss* C. A., 194; In the *rôle* of a canary, 193; Minot, H. D., 193; Notations, 83; Wilson, *Dr.* A., 193.
Bombay times (newspaper), 127.
Bonasa umbellus. *See* Ruffed grouse.
Bonnier, P., 230.
Booming. Night-hawk, 196.
Borrowing from the birds. Chewink, 45; Kingsley, *Rev.* C., 134; Old Dan Tucker borrowed from the hens, 108; Rooster, 105.
Boyle, *Mrs.* E. V. (G.), 230.
Brand, J., 171, 231.
Brehm, A. C., vii, 231.
Brehm *and* Hausmann, 231.
Brewster, W., 241; Drumming of partridge, 197.
Brimley, C. S., 231.
British singing-birds. Barrington's table of comparative merit of, 180.
Broderip, W. J., 231 ; Song-birds (quoted from D. Barrington), 121.
Brown mocker. *See* Thrush (*harporhynchus rufus*).
Brown thrasher. *See* Thrush (*harporhynchus rufus*).
Brown thrush. *See* Thrush (*harporhynchus rufus*).
Browning, R. Song thrush (poem), 223.
Bubo Virginianus. *See* Great horned owl.
Buckland, F., 126, 140, 231.
Buffon, G. L. L., *comte* de, 216, 231; Bishop same as organist, 186; Organist, 186.
Buist, *Dr.*, 231; Musical fishes, 126.
Bull. Notations, 120, 206.
Bullfinch, 133; Austin, G. L., 175.
Bumble-bee. Hinrichs, A. Notations, 226.
Burgh, A., 231; Birds are instinctive musicians, 135.
Burritt, E., 231.
Burroughs, J., 152, 166, 231, 241;

Chestnut-sided warbler, 157; Fox-colored sparrow, 155; Hermit thrush, 164; Linnet, 149; Rose-breasted grosbeak, 188; Wood-pewee, 143; Wood thrush, 164.

C., S. P. *See* Author.
Cabot, J. E., 175, 231.
Calandria. *See* Mocking-bird (*mimus orpheus*), 181.
California Academy of Sciences, 231.
Campanero (Bell-bird), 195.
Canary, 176; Bobolink in the *rôle* of a, 193.
Carlyle, T. On music of nature, 129.
Carpodacus purpureus. *See* Linnet.
Cat. Weber, *Dr.* F. Notations, 225.
Cat-bird (*mimus Carolinensis*), Notations, 52; Stearns, W. A., 159.
Century magazine, 148.
Chaffinch, 160, 180.
Chat, Yellow-breasted (*icteria viridis*). (*See also* Cat-bird, 52.) Notations, 80; Nuttall, T., 191; Wilson, *Dr.* A., 79.
Cheney, *Mrs.* Julia C. Author's last days, 171; Author's method of taking the bird-songs, 161.
Chestnut-sided warbler. *See* Warbler (*dendroica Pennsylvanica*).
Chewink (*pipilo erythrophthalmus*), 8; Notations, 45, 118, 156; "Rock of ages" and song of, 45, 118; Torrey, B. Extemporizing of, 155; Wilson, *Dr.* A., 45.
Chickadee (*parus atricapillus*). Devoutness of song of, 8; Flagg, W., 142; Minot, H. D., 143; Notations, 27, 123, 142.
Chickens. *See* Fowl language. — Hen. — Rooster.
Chiff-chaff, 160.
Chipmunk charmed by music, 142.
Chipping sparrow. *See* Sparrow (*spizella socialis*).
Chordeiles Virginianus. *See* Night-hawk.
Chrysomitris tristis. *See* Yellow-bird.
Church, *Mrs.* E. R., 231.
Clark, J. W. 231.
Clark, X., 132, 133, 134, 231.
Clothes-rack. Notation, 4.
Coccygus Americanus. *See* Yellow-billed cuckoo.
Coccygus erythrophthalmus. *See* Black-billed cuckoo.
Cock. *See* Rooster.
Cock chaffer. Hinrichs, A. Notation, 226.
Colaptes auratus. *See* Golden-winged woodpecker.
Coleman, A. P., 231, 241; Scarlet tanager, 185.
Collier, P. F., 241.
Colt. (*See also* Horse.) Notations, 205.
Colymbus torquatus. *See* Great northern diver.
Contopus virens. *See* Wood-pewee.
Cooper, J. G., 231.
Corwin, *U. S. Revenue-steamer*, 231.
Coues, *Dr.* E., vi, 196, 231, 241; Chipping sparrow, 40; Drumming of partridge, 196, 199; Field-sparrow, 35; Hermit thrush, 59; Oven-bird, 62; Wood-pewee, 143.
Cow. (*See also* Bull.) Music-loving cows, 141; Notation, 206; Weber, *Dr.* F. Notation, 224.
Cowper, W. Ode to the nightingale (Song thrush ?), 181.
Cricket. Hinrichs, A. Notation, 226; Music of, 128.
Crow, 175; Allen, J. A., 168; Notation, 205.
Crow-shrike (*gymnorhina tibicen*), 210.
Crowest, F. J., 136, 231.
Crustaceans, Stridulating, 128.
Cuckoo, 2, 160; Gardiner, W., 195; Haweis, *Rev.* H. R. Cuckoo's song, 116; Intervals in song of, 2, 88, 116, 135, 194, 195; Kircher, A., 195; Mitford, (—), 194; Notations, 194, 195; Gardiner, W., 213; Hawkins, *Sir* J., 217; Originator of the minor scale, 135; Song of Cuckoo and golden-winged woodpecker, 30.

Cuckoo, Black-billed (*coccygus erythrophthalmus*). Notations, 87.
Cuckoo, English. Intervals in song of, 116, 195.
Cuckoo, Yellow-billed (*coccygus Americanus?*), 194; Minot, H. D., 194; Notation, 89.
Cunz, B., 232.
Curlew, 192.
Cyanospiza cyanea. *See* Indigo-bird.
Cyphorhinus cantans. *See* Organ-bird.

Dancing and singing, 136.
Dara (Bell-bird), 195.
Darwin, C., 129, 196, 232.
Darwin, F., 232.
Davis, W. T., 126, 232.
Death-watch. Hinrichs, A. Notations, 226.
DeKay, J. E., 232.
Dekum, F., *President*. Society for Introduction of Singing-birds into Oregon, 183.
Dendroica æstiva. *See* Yellow warbler.
Dendroica Pennsylvanica. *See* Warbler.
Dendroica virens. *See* Black-throated green warbler.
Derby *and* Jackson (publishers), 235.
Diver, Great northern (*colymbus torquatus*), 95; Blake, G. Flying under water (Loon), 200; Notations, 97, 117; Thaxter, C. Loon, 200; Vickary, N., 97; Wilson, *Dr.* A., 95.
Dog. Notations : 206, Gardiner, W. 213, Weber, *Dr.* F., 224.
Dolichonyx oryzivorus. *See* Bobolink.
Donkey. Weber, *Dr.* F. Notation, 224.
Drumming. *See* Grouse, Ruffed.
Duck, Wild. Notation, 136.

Eclectic magazine, 142, 181, 230, 236, 237.
Edinburgh Philos. journ., 126.
Educational Publishing Company, 241.
Edwards, W. H., 232.
Eel, Music of, 126.
Emblem of the song guild, 129.
Emerson, R. W., 27, 193.
Encyclopædia Britannica, 140, 171, 232.
Encyclopædia Perthensis, 232.
Energy expended in bird-song, 190.
English cuckoo. *See* Cuckoo.
Estes *and* Lauriat, 241.
Evans, *Rev.* W. E., 232.
Extemporizing. Chewink, 45; Field-sparrow, 148; Flagg, W. Chewink, 156; Torrey, B. Chewink, 155.

Fatness. Bicknell, E. P. Effect of, on the singing of birds, 147.
Fewkes, *Dr.* J. W., 241; Author's notation of nature-music from the phonograph, 172.
Field-sparrow. *See* Sparrow (*spizella pusilla*).
Finch, Purple. *See* Linnet (*carpodacus purpureus*).
Fish, E. E., 137, 142, 232.
Fishes, Musical, 126.
Flagg, W., 142, 175, 232; Chewink extemporizes, 156; Copying of bird-songs, 114; Hermit thrush, 59; Notations by Flagg and the author, 125; Whippoorwill and quail, 168.
Flat, Birds sing, 152.
Flat-bill, 153.
Fletcher, W. I., 232.
Flicker. *See* Woodpecker (*colaptes auratus*).
Fly-catchers in Australia, 210.
Flying under water (Loon). Blake, G., 200.
Forbes, H. O., 128, 232.
Forbes, *Maj.* J., 171, 232.
Forest and stream (periodical), 232.
Foss, J., 188.
Foster, L. S., 241.
Fowl language. Holder, C. F., 201.
Fowler, W. W., 232; Bird-songs cannot be copied, 114.

Fowls. Gardiner, W. Notations, 212.
Fox-colored sparrow. *See* Sparrow (*passerella iliaca*).
Francheschini, R., 128, 232.
Francis d'Assisi, *Saint*, Legend of, 170.
Fraser's magazine, 231.
Free-willers, Worship of, 64.
Frog, Bull. Notations, 206.
Frog, Music of, 127.
Funeral chants, Origin of, 136.
Funk, N., 196, 232.

Gainborg, *Dr.*, 232.
Gambel's white-crowned sparrow. Notation, 153.
Gardiner, W., 128, 232; Notations: Ass, 213, Blackbird, 211, Cuckoo, 195, 213, Dog, 212, Fowls, 212, Hen, 211, Horse, 212, Lark, 213, Nightingale, 211, Ox, 212, Throstle, 211.
Gartenlaube (magazine), 128, 182, 210, 233, 236, 240.
Gassendi, P., 233; Bird-songs preferred to human music, 133.
Gefiederte Welt, Die (magazine), 233.
Genesis of bird-song, 134.
Gentleman's magazine, 137, 232, 237.
Geopelia tranquilla, Gould. See Ventriloquist dove.
Gibbs, *Dr.* M., 233.
Giraud, J. P., *Jr.*, 233; Hermit thrush, 165.
Gnat. Hinrichs, A. Notation, 226.
Goldfinch. (*See also* Yellow bird.) 180.
Goldfinch, American. *See* Yellow bird.
Golz, *Dr.* (—), *of Berlin*, vii, 181, 241; Bird-songs can be copied, 115; Notations of bird-songs by D. H. Beckler, 115; Song of gray nightingale cannot be copied, 115.
Goniaphea Ludoviciana. See Grosbeak.
Good, J. M., 233.
Goodwin, W. L., 233, 241; Birds sing out of tune, 152.
Gosse, P. H., 196, 233; Buffon's organist not same as solitaire, 187; Mocking-bird of Jamaica, 160; Morning song in Jamaica, 154.
Goulding, F. R., 233.
Grahame, *Rev.* J., 233.
Granauer, *Dr.* F., *of Vienna*, vii, 241.
Grasshopper. Hinrichs, A. Notations, 226.
Gray nightingale. *See* Nightingale.
Gray wag-tail, 160.
Great horned owl. *See* Owl (*bubo Virginianus*).
Great northern diver. *See* Diver (*colymbus torquatus*).
Greene, *Dr.* W. T., 233.
Greenfinch, 180.
Griswold, W. M., 233.
Grive chanteuse. Notations, 220.
Grosbeak, Purple. *See* Linnet (*Corpodacus purpureus*).
Grosbeak, Rose-breasted, 188; Burroughs, J., 188; Notation, 76.
Grouse, Ruffed (*bonasa umbellus*), 92; Drumming of: Audubon, J. J., 196, 197, 198, Batty, J. H., 198, Brewster, W., 197, Coues, *Dr.* E., 196, 199, Henshaw, H. W., 197, 198, Minot, H. D., 197, Nuttall, T., 197, 198, Ridgway, R., 199, Samuels, E. A., 197, Torrey, B., 199, Wilson, *Dr.* A., 94, 197, 198; Notations, 94.
Gymnorhina tibicen. See Crowshrike.

Haldeman, S. S., 233.
Hamerton, P. G., 233.
Hamilton, E., 233.
Hamm, W., 233.
Hardy, J., 233.
Harmonic affinities in bird music, 132, 133.
Harmony produced by bird-notes, 200.
Harper's magazine, 141, 142, 229, 236.
Harporhynchus rufus. See Thrush.
Harry Wicket. *See* Woodpecker (*colaptes auratus*).

Harting, J. E., 216, 233; Notations: Blackcap, 215; Reproducing bird-songs, 215; Willow warbler, 215.
Haweis, *Rev.* H. R. Cuckoo's song nearest approach to music in nature, 116.
Hawk. *See* Night-hawk.
Hawker, *Col.* (—). Swan, 215.
Hawkins, *Sir* J., 142, 233; Notations: Blackbird, 217, Cuckoo, 217,
Hayward, *Miss* C. A. Bobolink, 194.
Hedge-sparrow, 180.
Helmholtz, H. L. F., 233; Structure of melody, 130.
Hen. Composer of Old Dan Tucker, 108; Holder, C. F., 201, Fowl language, 201; Music and talk of, 201; Notations: 104, Gardiner, W., 211, Kircher, A., 217.
Henderson, W. J., 233; Nothing in nature that resembles music, 116.
Henshaw, H. W. Drumming of partridge, 197, 198.
Hérissant, (—), 140, 233.
Hermit thrush. *See* Thrush (*turdus pallasi*).
Hibberd, S., 233; Night songs, 160.
Higginson, T. W., 165, 234; Robin, 145.
High Hole. *See* Woodpecker (*colaptes auratus*).
Hill, R. Mocking-bird, 178; Solitaire, 187.
Hinrichs, *Miss* Anna, 128, 234; Notations: Bumble-bee, 226, Cock chaffer, 226, Cricket, 226, Death-watch, 226, Gnat, 226, House-fly, 226.
Hittock. *See* Woodpecker (*colaptes auratus*).
Holder, C. F. Fowl language, 201; Hen music and talk, 201; Rooster, 201.
Horse, 129; Notations of: 119, Gardiner, W., 212, Weber, *Dr.* F., 225.
Horsford, B., 234, 241; Thrush (Wood thrush ?), 165; White-throated sparrow, 152.
Houghton, Mifflin, & Co., 241.
House-fly. Hinrichs, A. Notation, 226.
Howell, A. H., 234.
Hoxie, W., 234.
Hudson, W. H., 137, 187, 234; Music and dancing in nature, 137; White-banded mocking-bird, 176.
Human speech, Birds reproduce complex forms of, 176.
Human voice. Bates, H. W. Organ-bird's song like, 186.

Ibis (magazine), 234.
Icteria viridis. *See* Chat.
Icterus Baltimore. *See* Oriole.
Imitation, 173, 174. (*See also* Mimicry.) American mocking-bird, 176; Barrington, D. Robin and nightingale, 174; Robin, skylark-linnet, wood-lark linnet, 175; Blackbird, 176; Bobolink, 175; Canaries, 176; Crow, 175; Hill, R. Mocking-bird, 178; Hudson, W. H. White-banded mocking-bird, 176; Human speech reproduced by birds, 137, 176; Thrush, 176; Sedge warbler, 176; Virginia mocking-bird, 178.
Improvement in bird-song, 174.
Inanimate music. *See* Clothes-rack. — Door. — Niagara. — Water dropping. *See also* Music in nature. — Notations.
Indian songs from the phonograph, Author's notation of, 172.
Indigo-bird (*cyanospiza cyanea*). Notations, 85.
Ingersoll, E., 146, 234, 241; Female oriole, 169.
Ingersoll, E., *and others*, 234; Voice of the goldfinch, 157.
Insect music. *See* Ant. — Bumble-bee. — Cock chaffer. — Cricket. — Death-watch — Gnat. — Grasshopper. — House-fly. — Notations.
Insects, Musical organs and music of, 141.
Intervals in bird-song. *See* Bird-song.

JAEGER, B., 234; Cricket music, 128.
Jamaica, Morning song in, 153.
Jefferies, R., 234; Ventriloquism explained, 151.
Jenner, *Dr.* (—). Signs from birds, 171.
Jesse, E., 234; Thrush, 173; Variations in bird-song, 173.
Job, 141.
Johnston, A. G. Solitaire (notations), 214.
Journal für Ornithologie, 234.

KAMTSCHATKALES use chords, $\frac{5}{4}$, $\frac{3}{4}$, 136.
Keeler, C. A., 234; Great horned owl, 200; White-throated sparrow, 153.
Kennedy, (—), 234.
Key, Change in. Nelson, H. L., 164.
Key, or tonality, in bird music, 131.
Kingsley, *Rev.* C., 234; Borrowing from the birds, 134.
Kircher, A., 129, 137, 140, 142, 234; Cuckoo, 195; Notations: Hen, 217; Nightingale, 218, Pigritia, or sloth, 217.
Knapp, J. L., 234; No progress in animal music, 176.
Knight, F. A., 182, 195, 234.

LABOULBÈNE, *Dr.* A., 234.
Landois, H., viii, 128, 235.
Larboard watch ahoy. Notations, 48, 117.
Lark. *See also* Sky-lark.
Lark, Names of saints pronounced by, 137; Gardiner, W. Notation, 213; Macgillivray, W., 193; Wood, *Rev.* J. G., 190.
Lark, Field. Lescuyer, F. Notations, 221.
Lark, Meadow (*sturnella magna*). Allen, J. A., 168; Notations, 33, 118, 124; Rhythmic beats of, 154; Tremolo of, 7; Wilson, *Dr.* A., 33.
Lark, Wood, 160, 179, 180, 181.
Leach, *Dr.* M. L., 235, 241; White-throated sparrow, 151.
Leather-head. Notation (No. 12), 210.
Lee, H., 235.
Leopardi, G., 235.
Le Page du Pratz, (—), 235; Bishop, 186.
Lescuyer, F., 182, 235; Notations: Field-lark (*alouette des champs*), 221, Nightingale (*rossignol*), 220, Throstle (*grive chanteuse*), 220.
LeVaillant, F., 235.
Lewis, E. J., 235.
Library of entertaining knowledge, 141, 176, 182, 194, 232.
Lindsay, *Lady* A., 235.
Lindsay, W. L., 235.
Linnet (*carpodacus purpureus*), 180; Burroughs, J., 149; Nelson, H. L., 149; Notations, 37.
Linnet, Skylark. Barrington, D., 175.
Linnet, Woodlark. Barrington, D., 175.
Littell's living age (magazine), 129, 142, 175, 182, 193, 230, 236, 237.
Little, Brown, & Co., 241.
Localities where the songs were taken, 113.
Lockwood, *Rev.* S., 126, 235.
Longman's magazine, 130.
Loon. *See* Diver (*colymbus torquatus*).
Lost hunter, 191.
Louisiana thrush, 62. *See also* Oven-bird.
Lowell, J. R., 235; On cry of screech-owl, 201.
Lucretius Carus, T., 135, 235; Man learned musical notes from birds, 122.
Lunt, H., 144, 157, 158, 166, 185, 188, 190, 235.
Luscinia philomela. *See* Nightingale.
Lyford, *Prof.* A. C., 235.
Lyre-bird (*menura superba*). Its powers of mimicry and ventriloquism, 210.

MACGILLIVRAY, W., 139, 140, 235; Lark, 193.

Macmillan & Co., 241.
Macy, C., 235.
Mammoth cave, Music in, 129.
Mare. (*See also* Horse, colt.) Notations, 206.
Martin, W. C. L., 235.
Maryland yellow-throat. Notation, 49.
Mavis. *See* Thrush (*harporhynchus rufus*).
Mayer, A. M., 152, 235, 241.
Maynard, C. J., 235.
Meadow lark. *See* Lark (*sturnella magna*).
Melodies, poems, *etc.* (*See also* Bird-songs. — Inanimate music. — Music in nature. — Night-songs. — Notations.) Bobolink's song in poetry, 192; Browning, R. Song thrush (poem), 223; Larboard watch ahoy, 48, 117; Last rose of summer, 175; Melody whistled while heating iron (horseshoes), 189; Partant pour la Syrie, 186; Rock of ages, 45, 118; Seven sleepers (oratorio), 108, 119; Spinning-girls' song, 20; Titmouse (poem), 27; Wood-pewee (poem by Trowbridge), 65; Worship of Free-willers (wood-pewee's song), 64.
Melody, Structure of, 130; What is, 2.
Melospiza melodia. *See* Sparrow.
Menura superba. *See* Lyre-bird.
Merriam, C. H., 241.
Merriam, F. A., 235.
Meyer, A. B., *and* Helm, F., 236.
Mice, Vesper, music of, 126.
Michelet, J., 236.
Miller, O. T., 236, 242; Oriole, 169; Robin, 169; Song-sparrow, 169; Variations in bird-songs, 169.
Mimicry. (*See also* Imitation.) Catbird, 159; Lyre-bird, 210.
Mimus Carolinensis. *See* Cat-bird.
Mimus Orpheus. *See* Mocking-bird.
Mimus polyglottus, Boie. *See* Mocking-bird.
Mimus triurus. *See* Mocking-bird.
Minor scale, Origin of, 135.
Minot, H. D., vi, 236, 242; Black-throated green warbler, 157; Blue-bird, 144; Bobolink, 193; Chestnut-sided warbler, 157; Chickadee, 143; Drumming of partridge, 197; Field-sparrow, 35; Night-hawk, 167; Nightingale, 181; Red-eyed vireo, 190; Redstart's song, 158; Rose-breasted grosbeak, 188; Skylark, 193; Song-sparrow, 146; White-throated sparrow, 150; Wood-pewee, 144; Wood-thrush, 181; Yellow-billed cuckoo, 194.
Mitford, (—), Cuckoo, 194.
Mivart, St. G., 140, 236.
Mock nightingale, Norfolk, 180.
Mocker, Brown. *See* Thrush (*harporhynchus rufus*).
Mocking-bird. (*See also* Brown thrush. — Cat-bird, 52), 133.
Mocking-bird (*mimus Orpheus*). Darwin, C., 181.
Mocking-bird (*mimus polyglottus, Boie*). Hill, R., 178.
Mocking-bird, White-banded (*mimus triurus*), 136; Hudson, W. H., 176.
Mocking-bird, Virginia, 178.
Montagu, *Col.* G., 236.
Morning song in Jamaica, 153.
Mottled owl. *See* Owl (*scops asio*).
Moult and fatness. Bicknell, E. P. Effect of, on the singing of birds, 147.
Mouse-song. Vesper-mice, 126.
Müller, J., 140, 236.
Müller, Karl, 151, 236.
Munger, C. A., 236; Brown thrush, 159; Oriole, 169.
Murdoch, J. B., 236.
Music. (*See also* Bird-song. — Bird-songs. — Inanimate music. — Melodies. — Music in nature. — Notations. — Song-birds. — Songs.) Effect of, on snakes, 142; Henderson, W. J. Nothing in nature that resembles music, 116; Human, 130; Pole, W. Structure of, 123; Universal effect of, 141.
Music, Animal, 130. (*See also* Bird-songs. — Insect music. — Music in nature. — Notations.)

Music in nature. (*See also* Bird-songs. — Inanimate music. — Insect music. — Notations.) 2, 4, 117, 126; Ant music, 128; Ape (Gibbon), 129; Ass, 129; Carlyle, T., 129; Cricket, 128; Eel, 126; Fish, 126; Frog, 127; Haweis, *Rev.* H. R. Cuckoo's song nearest approach to, 116; Horse, 129; Peacock, 129; Sonorous sand, 129; Speech, 129; Stones, 129; Vesper-mice, 126; Waters of Niagara, 130.
Music-loving cows, 141.
Music of nature, Various notations of, 203.
Musical fishes. *See* Music in nature.
Musical insects. *See* Music in nature.
Musicapa armillata, *Viellot*. *See* Solitaire.

Natural history of birds (Harper & Bros.), 142, 236.
Natural history of English song-birds, 181, 236.
Naturalist's note-book, 230.
Nature (magazine), 126, 128, 176, 195, 236, 238, 239.
Nature, Music in. *See* Music in nature.
Naumann, J. F., 236.
Nehrling, H., 165, 181, 236.
Nelson, E. W., 236; Bluebird and robin, 145.
Nelson, H. L., 237; Bird-songs at Worcester, 158; Linnet, 149; Ovenbird, 165; Redstart's song resembles yellow warbler's, 158; Song of Hermit thrush, wood thrush, and veery, 164; Song of robin and tanager, 185; Song-sparrow, 146; Veery, 163; Wood thrush, 161; Yellow warbler, 156.
New England magazine, 159, 162, 163, 237.
New Monthly magazine, 135, 141, 236, 237.
New South Wales, Bird-songs in, 209.
Newness of the field, 1, 113, 120.
Niagara, Music of, 130.
Nicols, A., 175, 237.
Night-hawk (*chordeiles Virginianus*), 66; And whippoorwill, 67; Booming of, 196; Minot, H. D., 167; Samuels, E. A., 167; Wilson, *Dr.* A., 66.
Night-jars, 153.
Night-songs, 159; Chaffinch, 160; Chiff-chaff, 160; Cuckoo, 160; Golden oriole, 160; Gray wag-tail, 160; Mocking-bird of Jamaica, 160; Nightingale, 160; Reed-wren, 160; Ring-ousel, 160; Robin, 160; Samuels, E. A. Brown thrush, 159; Thrush, 160; Water-ousel, 160; White-throat, 160; Willow-wren, 160; Wood-lark, 160; Wren, 160.
Nightingale, 160, 180; And his rivals, 179; Barrington, D., 174; Compass of, 181; Cowper, W. Ode to (Song thrush ?), 181; Minot, H. D., 181; Notations of: Gardiner, W., 211, Kircher, A., 218, Lescuyer, F., 220, Nuttall, T., 165; Song of blue thrush mistaken for song of, 181; Walton, I., 182.
Nightingale, American. *See* Thrush (*turdus fuscescens*).
Nightingale, Gray (*luscinia philomela*), 115; Golz, *Dr.* Song cannot be copied, 115.
Nightingale, Norfolk mock, 180.
Norfolk mock nightingale, 180.
North British review (magazine), 176, 230.
Notations. Accentor, Golden-crowned, 63; Ass, 213; Beckler, D. H. (names of birds not given), 208; Bird (name unknown) 148; Blackbird, 211, 217, 222; Blackcap, 215; Bluebird, 11; Bob White, 90; Bobolink, 83; Bull, 120, 206: Bull-frogs, 206; Bumble-bee, 226; Cat, 225; Cat-bird, 52; Chat, Yellow-breasted, 80; Chewink, 45, 118, 156; Chickadee, 27, 123, 142; Clothes-rack, 4; Cock, 212, 225; Cock (a passage in oratorio of the Seven sleepers), 119; Cock chaffer, 226; Colt, 120, 205;

Cow, 206, 224; Cricket, 226; Crow, 205; Cuckoo, 135, 194, 195, 213, 217; Cuckoo, Black-billed, 87; Cuckoo, Yellow-billed, 89; Death-watch, 226; Diver, Great northern, 97, 117; Dog, 206, 212; Dog (barking), 224; Donkey, 224; Duck, Wild, 136; Finch, Purple, 37; Flicker, 30; Fowls, 212; From the author's diary, 205; From the phonograph, 172; Gnat, 226; Grasshopper, 226; Grosbeak, Purple, 37; Grosbeak, Rose-breasted, 76; Grouse, Ruffed, 94; Hen, 211; Hen (after laying), 217; Hen music, 104; Horse, 212, 225; Horse (colt), 120, 205; Horse (mare), 119, 206; House-fly, 226; Indigo-bird, 85; Instrument for taking pitch of bird-songs, 191; "Larboard watch ahoy" and song of black-throated green warbler, 117; Lark, 213; Lark, Field, 221; Lark, Meadow, 33, 118, 124; Leather-head (No. 12), 210; Linnet, 37; Loon, 97, 117; Mare, 119, 206; Niagara, Waters of, 130; Nightingale, 211, 218, 220; Nuthatch, White-bellied, 29; Oriole, 169; Oriole, Baltimore, 71; Oven-bird, 63; Owl, Great horned, 99; Owl, Mottled, 100; Owl, Screech, 100; Ox, 212; Partridge, 94; Pewee, 17; Pheasant, 94; Quail, 90; Redstart, 51; Robin, 14; Robin, Ground, 45, 118; "Rock of ages" (melody) and song of chewink, 118; Rooster, 107, 119, 205; Soldier (No. 12), 210; Solitaire, 214; Sparrow, Chipping, 40; Sparrow, Field, 36; Sparrow, Fox-colored, 44; Sparrow, Gambel's white-crowned, 153; Sparrow, Golden-crowned, 153; Sparrow, Song, 23, by W. Flagg and the author, 125; Sparrow, White-throated, 42, 150, 151, 152; Spinning girls' song compared with robin's song, 20; Swan, 216; Tanager, Scarlet, 74, 185; Thrasher, Brown, 54; Throstle, 211, 220; Thrush, 220; Thrush (Wood ?), 165; Thrush, Big-tree, 162; Thrush, Brown, 54; Thrush, Hermit, 60, 124; Thrush, Song, 56, 222; Thrush, Tawny, 58; Thrush, Wilson's, 58, 164; Thrush, Wood, 56, 124, 161, 162; Titmouse, 117; Towhee bunting, 45, 118; Various notations of music of nature, 203; Veery, 58; Vireo, Red-eyed, 78; Waltz and bird-song compared, 135; Warbler, Black-throated green, 48, 117; Warbler, Chestnut-sided, 49; Warbler, Maryland yellow-throat, 49; Warbler, Willow, 215; Warbler, Yellow, 47; Warblers, American (*sylvicolidæ*), 49; Water dropping from a faucet, 3; Whippoorwill, 68; Wilson thrush, 58, 164; Wind, 224; Wind (wailing), 224; Wood-pewee, 64, 118, 143; Woodpecker, Golden-winged, 30; Yellow-bird, 39.

Notes and queries (magazine), 237.

Nuthatch, White-bellied (*sitta Carolinensis*), 29, 147.

Nuttall, T., 237; Black-throated green warbler, 158; Bluebird, 145; Drumming of partridge, 197, 198; Hermit thrush, 165; Nightingale, 165; Oven-bird, 167; Red-eyed vireo, 190; Redstart's song, 158; Rose-breasted grosbeak, 188; Song-sparrow, 147; Wood-pewee, 144; Wood thrush, 162, 163, 165; Yellow-breasted chat, 191.

Nuttall Ornithological Club, 237.

Nutting, C. C., 137, 237.

O'Kelly, *Col.* His famous parrot, 137.

Oppel, *Prof.*, 237.

Oregon, Soc. for Introd. of Useful Singing-birds into, 182.

Oreoica, Ventriloquism among the, 210.

Organ-bird (*cyphorhinus cantans*), Bates, H. W., 186.

Organist (*pipra musica, Gmel.*). Buffon, G. L. L., *comte* de. Bishop

same as, 186; Gosse, P. H. Buffon's organist not same as solitaire, 187; Hill, R. Buffon's organist same as solitaire, 187.
Organs of song, 140.
Oriole, 168; Allen, J. A., 168; Difference between song of old and young, 26; Ingersoll, E. Song of female, 169; Miller, O. T., 169; Munger, C. A., 169; Notation, 169; Song of oriole at burial of author, 170.
Oriole, Baltimore (*icterus Baltimore*), 71; Allen, J. A., 168.
Oriole, Golden, 160.
Ornithologist and oölogist (magazine), 237.
Ortyx Virginianus. *See* Quail.
Ou-thee-quan-nor-ow. *See* Woodpecker (*colaptes auratus*).
Oven-bird (*seiurus aurocapillus*), 62; Allen, G., 167; Audubon, J. J., 166. Baird, Brewer, *and* Ridgway, 167; Bicknell, E. P., 166; Coues, *Dr.* E., 62; Nelson, H. L., 165; Notation, 63; Nuttall, T., 167; Richardson, (—), 167; Wilson, *Dr.* A., 62, 166.
Overland monthly (magazine), 231.
Owen, *Sir* R., 237.
Owl, Great horned (*bubo Virginianus*), 98, 200; Notation, 99; White, *Rev.* G., 99.
Owl, Mottled (*scops asio*). Lowell, J. R., Screech-owl, 201; Notations, 100; Wilson, *Dr.* A., 102.
Ox. Gardiner, W., Notation, 215.

Palmer, T. S., 242.
Paolluci, *Prof.* L., 237.
Parrot, 137.
Partridge. *See* Grouse (*bonasa umbellus*).
Parus atricapillus. *See* Chickadee.
Passerella iliaca. *See* Sparrow.
Peacock, Music of, 129.
Peadove, 153.
Peal, S. E., 126, 128, 237.
Petchary, 153.
Pewee. Notation, 17.
Pfluger, C. F., 182, 242.
Pheasant. *See* Grouse (*bonasa umbellus*).
Phonograph, Notations from the, 172.
Pigritia. Kircher, A. Notation, 217.
Pipilo erythrophthalmus. *See* Chewink.
Pipra musica, Gmel. *See* Organist.
Pitch in bird music, 131; Instrument for taking pitch of bird-songs, 191.
Piut. *See* Woodpecker (*colaptes auratus*).
Placzek, *Dr.* B., 237; Why birds sing, 139.
Plinius Secundus, C., vi, 182, 237.
Pliny. *See* Plinius Secundus, C.
Plumage *vs.* song, 185. *See* note, 210.
Pole, W., 130, 237; Bird-songs not to be called "either music or melody," 123.
Pollard, J., 237.
Pontecoulant, A., *marquis* de, 142, 237.
Poole, *Dr.* W. F., 238.
Popular science monthly, 126, 230, 236.
Poultry. *See* Fowl language.—Fowls. — Hen. — Rooster.
Putnam's monthly (magazine), 137.
Pyranga rubra. *See* Tanager.

Quail (*ortyx Virginianus*). Notation, 90.
Quail and whippoorwill. Flagg, W., 168.

R., M. H., 238; Natural bird-songs never capable of notation, 114.
Rainey, H. J., 238,
Realejho. *See* Organ-bird.
Red-eyed vireo. *See* Vireo.
Redpole, 180.
Redstart (*setophaga ruticilla*). Minot, H. D. Variations in song of, 158; Notation, 51; Nuttall, T., 158; Song resembles yellow warbler's, 158.
Reed-sparrow, 180.

Rhoads, S. N., 135, 238.
Rhythm. Bull-frogs, 207; In bird-song, 131, 154, 208; Sully, J., 131.
Richardson, (—). Oven-bird, 167.
Ridgway, R., 238, 242; Drumming of partridge, 199; Scarlet tanager, 185.
Ring-ousel, 160.
Robin (*turdus migratorius*), 139. (*See also* Cat-bird, 52); Burlesque performance of, 16; Imitation, 174; Miller, O. T., 169; Nelson, E. W., 145; Song of tanager and, 185; Notations, 14; Samuels, E. A. Song of tanager and, 185; Signal for flight, 20; Song, 13; Song of a caged, 174; Spinning girls' song compared with robin's song, 20; Variety of melodies, 18.
Robin, English, 160, 174, 175, 180.
Robin, Ground. *See* Chewink (*pipilo erythrophthalmus*).
Robins in Australia, 210.
"Rock of ages" and song of chewink, 45, 118.
Romanes, G. J., 142, 238.
Rooster. (*See also* Fowl language. — Hen music.) Notations 119, 205, Gardiner, W., 212, Weber, *Dr.* F., 225.
Rose-breasted grosbeak. *See* Grosbeak (*goniaphea Ludoviciana*).
Rossignol. Notations, 220.
Royal Society of London. *Philos. trans.*, 129, 238.
Rudolph, Alex. J., 241.
Ruffed grouse. *See* Grouse (*bonasa umbellus*).
Russ, *Dr.* K., *of Berlin*, viii, 242.

Saint Francis d'Assisi, Legend of, 170.
Saint Theresa, Prayer to. Green warbler. —White-throated sparrow, 150.
Samuels, E. A., 240, 242; Brown thrush, 159; Black-throated green warbler, 157; Drumming of partridge, 197; Hermit thrush, 164; Night-hawk, 167; Red-eyed vireo, 190; Rose-breasted grosbeak, 188; Ruffed grouse, 197; Song of robin and tanager, 185; Wood thrush, 164.
Sand, Sonorous, 129.
Saunders, W. E., 238.
Savart, (—), 238.
Saxby, H. L., 238.
Scale, minor, Origin of, 135.
Scarlet tanager. *See* Tanager (*pyranga rubra*).
Schele de Vere, M. R. B., 128, 142, 238.
Scops asio. *See* Owl.
Screech-owl. *See* Owl (*scops asio*).
Scudder, S. H., 128, 238.
Seebohm, H., 238.
Seiurus aurocapillus. *See* Oven-bird.
Setophaga ruticilla. *See* Redstart.
Seven sleepers (oratorio), Cock crows passage in, 119.
Sexual selection. Sully, J. Improves voice of birds, 138.
Shakespeare, 141.
Sharpe, R. B., 238.
Sialia sialis. *See* Bluebird.
Sidebotham, J., 238.
Signs from birds, 171.
Singing and dancing, 136.
Siskin, 180.
Sitta Carolinensis. *See* Nuthatch.
Skelding, S. B., 238.
Skylark, 180; Minot, H. D., 193.
Slater, H. H., 238.
Sloth. Kircher, A. Notation, 217.
Smee, A., 238; Blackbird, 223, notations, 222; Difficulty of recording notes of song-birds, 223; Song thrush, 223, notations, 222.
Smee, F., 223.
Smithsonian Institution, 238.
Snakes, Effect of music on, 142.
Soldier. Notation (No. 12), 210.
Solitaire (*musicapa armillata, Viellot*), 154, 187; Gosse, P. H. Buffon's organist not same as, 187; Hill, R., 187, Buffon's organist same as, 187; Johnston, A. G. Notations, 214.

Song, Organs of, 140.
Song-birds. (*See also* Bird-song.— Bird-songs.— Birds.— Borrowing from birds.— Music.— Night-songs. — Notations.— Songs.) Australian singers, 209; Barrington, D. On notation of music of, 121; Table of comparative merit of British, 180; New South Wales, 209; Smee, A. Difficulty of recording notes of, 223; Soc. for Introd. of Useful Singing-birds into Oregon, 182; Song of birds is innate, 175; Thompson, M. Duty of protecting, 136.
Song guild, Emblem of the, 129.
Song-sparrow. *See* Sparrow (*melospiza melodia*).
Song-thrush. *See* Thrush (*turdus mustelinus*).
Songs (*See also* Bird-song. — Bird-songs. — Inanimate music. — Melodies. — Music in nature. — Night-songs. — Notations. — Song-birds),
Songs, Variations in. *See* Bird-song.
Sparrow, Chipping (*spizella socialis*). Coues, *Dr.* E., 40; Notation, 40.
Sparrow, Field (*spizella pusilla*), 26, 35; Coues, *Dr.* E., 35; Extemporizing, 148; Minot, H. D., 35; Notation, 36; Torrey, B., 149; Wilson, *Dr.* A., 35.
Sparrow, Fox-colored (*passerella iliaca*), 155; Baird, Brewer, *and* Ridgway, 155; Burroughs, J., 155; Notation, 44; Torrey, B., 155.
Sparrow, Gambel's white-crowned. Notation, 153.
Sparrow, Golden-crowned. Notation, 153.
Sparrow, Hedge, 180.
Sparrow, Reed, 180.
Sparrow, Song (*melospiza melodia*). Bicknell, E. P., 147; Miller, O. T., 169; Minot, H. D., 146; Nelson, H. L., 146; Notations, 23, By W. Flagg and the author, 125; Nuttall, T., 147; Stearns, A. W., 147; Torrey, B., 146; Trill of, 23.
Sparrow, White-throated (*zonotrichia albicollis*). Baird, Brewer, *and* Ridgway, 149; Keeler, C. A., 153; Leach, M. L., 151; Minot, H. D., 150; Notations, 42, 150, 151, 152; Rhythm, 154; Song, 8; Song interpreted as prayer to Saint Theresa, 150; Song shortens as the season advances, 43; Variation in song of, 150.
Spectator, The (magazine), 176.
Speech, Music in, 129.
Spencer, H., 140, 238.
Spinning girls' song compared with robin's song, 20.
Spizella pusilla. *See* Sparrow.
Spizella socialis. *See* Sparrow.
Starling, 133.
Stearns, R. C., 142, 238.
Stearns, W. A., vi, 238; Cat-bird, 159; Red-eyed vireo, 190; Song-sparrow, 147; Wood-pewee, 144.
Stein, F., 239.
Sterne, C., 128, 239.
Stewart, J. V. Willow-warbler (notation quoted by J. E. Harting), 215.
Stones, Musical, 129.
Storer, D. H., *and* Peabody, W. B. O., 239.
Stuhr, (—) (bird-dealer), Portland, 184.
Sturnella magna. *See* Lark.
Sturt, *Capt.* C., 151, 239.
Sully, J., 239, 242; Intervals in bird-song, 132; Rhythm in bird-song, 131; Sexual selection improves bird-song, 138; Structure of melody, 132; Tonality in bird-song, 132.
Swan. Arnaud, *Abbé*. Voice of, 216; Bertini, A. Notation, 216; Hawker, *Col.*, 215.
Swiss cross, The (magazine), 239.
Sylvicolidæ. *See* American warblers.

Table of comparative merit of British singing-birds, 180.
Tanager. Difference between song of old and young, 26; Song of robin and, Nelson, H. L., 185, Samuels, E. A., 185.

Tanager, Scarlet (*pyranga rubra*). Baird, Brewer, *and* Ridgway, 185; Coleman, A. P., 185; Notations, 74, 185; Ridgway, R., 185; Wilson, *Dr.* A., 185.
Tawny thrush. *See* Thrush (*turdus fuscescens*).
Taylor, Charlotte, 141, 239.
Taylor, H. R., 239.
Taylor, J. E., 239; Imitation in singing birds: sedge warbler, American mocking-bird, 176.
Taylor, R., 239.
Tennent, *Sir* J. E., 126, 239.
Thaxter, C. Loon, 200.
Thayer, E. M., 129, 239.
Theuriet, A., 239.
Thomae, F., *of Tübingen*, viii, 242.
Thompson, M., 140, 239, 242; Duty of protecting song-birds, 136; Genesis of bird-song, 136; Rhythmic beat in bird-songs, 154.
Thomson, J. S., 239.
Thoreau, H. D., 239.
Thrasher, Brown. *See* Thrush (*harporhynchus rufus*).
Throstle. *See* Thrush.
Thrush, 160, 176, 180; Gardiner, W. Notation of throstle's song, 211; Jesse, E., 173; Lescuyer, F. Notations of song of *grive chanteuse* (throstle), 220.
Thrush, Big-tree. Belding, L., 162; Notation, 162; Songs of wood thrush and, 162.
Thrush, Blue, 181; Song often mistaken for nightingale's, 181.
Thrush, Brown (*harporhynchus rufus*). (*See also* Cat-bird, 52); Munger, C. A., 159; Notations, 54; Samuels, E. A. Sometimes called brown mocker, 159; Torrey, B., 159.
Thrush, Hermit (*turdus pallasi*), 59; Baird, Brewer, *and* Ridgway, 165; Burroughs, J., 164; Coues, *Dr.* E., 59; Flagg, W., 59; Giraud, J. P., *Jr.*, 165; Greatest singer of New England, 59; Notations, 60, 124; Nuttall, T., 165; Samuels, E. A., 164; Song like opening of a grand overture, 60; Song of hermit thrush, wood thrush, and veery, 164; Wilson, *Dr.* A., 59.
Thrush, Hopping-dick, 153.
Thrush, Louisiana. The oven-bird: its equal as a singer, 62.
Thrush, Song (*turdus musicus*), 192; Browning, R., 223; Notations (*turdus mustelinus*), 56; Smee, A., Notations (*turdus musicus*), 222; Song thrush (*turdus musicus*), 223.
Thrush, Tawny (*turdus fuscescens*). Baird, Brewer, *and* Ridgway, 163; Nelson, H. L. Veery, 163, 164; Notation (veery), 58.
Thrush, Wilson's. *See* Thrush (*turdus fuscescens*).
Thrush, Wood (*turdus mustelinus*), 160; Baird, Brewer, *and* Ridgway, 162, 165; Burroughs, J., 164; Minot, H. D. Compares it with nightingale, 181; Nelson, H. L., 161, 164; Notations, 56, 124, 161, 162 (wood thrush, 165); Nuttall, T., 162, 163, 165; Songs of big-tree thrush and, 162.
Time in bird music, 131.
Titlark, 180.
Titmouse, Black-capped. *See* Chickadee (*parus atricapillus*), 27, 117.
Tonality or key in bird music, 131.
Torrey, B., 239, 242; Bird music, 138; Brown thrush, 159; Chewink extemporizes, 155; Drumming of the partridge, 199; Field-sparrow, 149; Fox-colored sparrow, 155; Song-sparrow, 146.
Towhee. Allen, J. A., 168.
Towhee bunting. *See* Chewink (*pipilo erythrophthalmus*).
Treatise on British song-birds, 231, 239.
Tremolo in song of meadow-lark, 7.
Trill, Song-sparrow's, 23.
Trowbridge, J. T., Wood-pewee, 65.
Tucker, Old Dan, Borrowed from the hen, 108.
Tune, Birds sing out of, 152.
Turdus fuscescens. *See* Thrush.

Turdus merula. *See* Blackbird.
Turdus migratorius. *See* Robin.
Turdus musicus. *See* Thrush.
Turdus mustelinus. *See* Thrush.
Turdus pallasi. *See* Thrush.

U. S. Dept. of Agriculture, 239.
U. S. National Museum, 240.
Urania sloaneus (Butterfly), 160.

Variations in bird-song, 168, 173. (*See also* Bird-song.) Allen, J. A., 168; Belding, L., 163; Jesse, E., 173; Miller, O. T., 169; Minot, H. D. Redstart, 158; Song of young and old birds, 25, 26; Song of same birds, 8.
Veery. *See* Thrush (*turdus fuscescens*).
Ventriloquism. Atrichias, 210; Explained, 151; Lyre-bird, 210; Oreoica, 210.
Ventriloquist dove (*geopelia tranquilla, Gould*), 151.
Vesper-mice, Music of, 126.
Viardot, L., 142, 240.
Vickary, N. Great northern diver, 97.
Vireo olivaceus. *See* Vireo.
Vireo, Red-eyed (*vireo olivaceus*), 189. (*See also* Cat-bird, 52.) Minot, H. D., 190; Notation, 78; Nuttall, T., 190; Samuels, E. A., 190; Stearns, W. A., 190.
Voice. Sully J. Sexual selection improves, 138.

W., J. M., 240.
Wake-up. *See* Wood-pecker (*colaptes auratus*).
Walker, R. C., 242.
Wallace, A. R., 137, 140, 240.
Walton, I., 240; Nightingale, 182.
Warbler, Black-throated green (*dendroica virens*), 8; Minot, H. D., 157; Notations, 48, 117; Nuttall, T., 158; Samuels, E. A., 157; Similarity between its song and "Larboard watch," 48; Song interpreted as prayer to Saint Theresa, 150.
Warbler, Chestnut-sided (*dendroica Pennsylvanica*). Burroughs, J., 157; Minot, H. D., 157; Notation, 49.
Warbler, Maryland yellow-throat. Notation, 49.
Warbler, Sedge. Taylor, J. E., 176.
Warbler, Willow. Harting, J. E. Notation, 215.
Warbler, Yellow (*dendroica æstiva*). Notation, 47; Nelson, H. L., 156; Song resembles redstart's; 158; Vocal power of, 156.
Warblers, American (*sylvicolidæ*). Notations, 49.
Warren, *Uncle* (*pseud.*), 240.
Water dropping from a faucet. Notation, 3.
Water-ousel, 160.
Waterton, C., 240; Bell-bird, 196.
Watt, R., 240.
Weber, *Dr.* F., 129, 130, 133, 240, 242; Notations: — Cat, 225, Cock, 225, Cow, 224, Dog (barking), 224, Donkey, 224, Horse, 225, Wind, 224, Wind (wailing), 224.
West shore (newspaper), Portland, Or., 184, 237.
Whelwright, H. W., 127, 240.
Whippoorwill (*Antrostomus vociferus*), 167; Flagg, W. Quail and, 168; Night-hawk and, 67; Notations, 68; Wilson, *Dr.* A., 69.
Whistling of birds, 133.
White, *Rev.* G., 126, 240; Great horned owl, 99.
White-banded mocking-bird. *See* Mocking-bird.
White-bellied Nuthatch. *See* Nuthatch (*sitta Carolinensis*).
White-throat, 160.
White-throated sparrow. *See* Sparrow (*zonotrichia albicollis*).
Why birds sing, 139.
Wienland, D. F., 240.
Wilkinson, A. G. White-throated sparrow, 152.

Willow-wren, 160.
Willy, T. P., 240.
Wilson, *Dr.* A., vi, vii, 128, 143, 240; Bobolink, 193; Chewink, 45; Drumming of the ruffed grouse (partridge), 94, 197, 198; Field-sparrow, 35; Golden-winged woodpecker, 31; Great northern diver, 95; Hermit thrush, 59; Meadow lark, 33; Most charming of writers on birds, 114; Mottled owl, 102; Night-hawk, 66; Oven-bird, 62, 166; Scarlet tanager, 185; Tawny thrush, 58; Whippoorwill, 69.
Wilson's thrush. Notations, 58, 164.
Wind. Weber, *Dr.* F. Notations, 224.
Wood, *Rev.* J. G., 240; Energy expended in bird-song, 190; Lark, 190.
Woodpecker, Golden-winged (*colaptes auratus*). Notations, 30; Song of cuckoo and, 30; Wilson, *Dr.* A., 31.
Wood-pewee (*contopus virens*), 8; Burroughs, J., 143; Coues, *Dr.* E., 143; Notations, 64, 118, 143; Nuttall, T., 144; Stearns, W. A., 144; Wilson, *Dr.* A., 143.
Wood thrush. *See* Thrush (*turdus mustelinus*).
Woodwall. *See* Golden-winged woodpecker.
World of wonders, 240.
Wren, 160, 180.

Yarrell, W., 126, 140, 176, 240.
Yarrup. *See* Woodpecker (*colaptes auratus*).
Yellow-billed cuckoo. *See* Cuckoo (*Coccygus Americanus*).
Yellow-bird (*chrysomitris tristis*), 180. (*See also* Goldfinch.) Love-song of goldfinch, 157; Notations, 39; Vocal power of goldfinch, 156.
Yellow-breasted chat. *See* Chat (*icteria viridis*).
Yellow hammer. *See* Woodpecker (*colaptes auratus*).
Yellow warbler. *See* Warbler (*dendroica æstiva*).
Youmans, W. J., 242.
Young, R., 240.
Yucker. *See* Woodpecker (*colaptes auratus*).

Zoe (magazine), 240.
Zonotrichia albicollis. *See* Sparrow.
Zoölogist, The (magazine), 240.

C Cheney,

AUG 16 192

MAR 1
FEB 21
JAN 3

AMNH LIBRARY
100112946